DOCUMENT RESUME

ED 090 674 88 EA 006 125

AUTHOR McGuffey, Carroll W.
TITLE Systematic Planning for Educational Facilities.
INSTITUTION Chicago Board of Education, Ill. Dept. of Facilities Planning.
SPONS AGENCY Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
BUREAU NO 71-7619
PUB DATE 73
GRANT OEG-5-71-0078(290)
NOTE 128p.; Related documents are ED 082 284, ED 083 693, ED 084 659, ED 084 681 and 682, ED 085 833, EA 005 947, EA 006 123 and 124, and EA 006 126 and 127

EDRS PRICE MF-$0.75 HC-$6.60 PLUS POSTAGE
DESCRIPTORS Architectural Programing; Community Characteristics; Educational Facilities; Enrollment Projections; Estimated Costs; Facility Improvement; Facility Inventory; *Facility Planning; Facility Requirements; *Information Systems; *Management Systems; Master Plans; Models; Needs; Resource Allocations; *Simulation; *Systems Approach
IDENTIFIERS Elementary Secondary Education Act Title III; ESEA Title III; Needs Assessment; *Simu School

ABSTRACT

This monograph provides a systematic approach to the problem of planning educational facilities. It first presents a conceptual framework for a general facilities planning and management system called Facilities Resource Allocation Management Evaluation System (FRAMES). The main components of FRAMES are identified as: (1) needs assessment, (2) facilities programing, (3) resource allocation and distribution, (4) facilities management, and (5) evaluation. The report then focuses attention on the needs assessment component and provides a detailed description of a carefully developed and tested needs assessment model. The monograph should be of considerable interest to practicing planners as well as to college students interested in facilities planning. (Author)

ED 090674

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRO-
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIGIN-
ATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRE-
SENT OFFICIAL NATIONAL INSTITUTE OF
EDUCATION POSITION OR POLICY

ED 090674

This monograph was prepared pursuant to a grant from the U.S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

SYSTEMATIC PLANNING FOR EDUCATIONAL FACILITIES

By

C. W. McGuffey, D. Ed.
Professor of Educational Administration
College of Education
University of Georgia
Athens, Georgia

Project Simu-School: Chicago Component

Funded by:
U.S. Office of Education
ESEA Title III, Section 306
Grant OEG-5-71-0078 (290)
Project 71-7619

Joseph P. Hannon
Project Director

Simu-School: Center for Urban Educational Planning
Chicago Board of Education
28 East Huron Street
Chicago, Illinois 60611

1973

FOREWORD

Modern-day educational planners face an extremely difficult task of providing quality education to large masses of students in view of decreased revenues, soaring costs, shifting populations and changing educational programs. Such a challenge requires that a far greater emphasis be placed on planning for schools than has been the case to date and necessitates the development of improved techniques specially designed for educational planning.

Project Simu-School is intended to provide an action-oriented organizational and functional framework necessary for tackling the problems of modern-day educational planning. It was conceived by a task force of the National Committee on Architecture for Education of the American Institute of Architects, working in conjunction with the Council of Educational Facility Planners. The national project is comprised of a network of component centers located in different parts of the country.

The main objective of the Chicago component is to develop a Center for Urban Educational Planning designed to bring a variety of people--laymen as well as experts--together in a joint effort to plan for new forms of education in their communities. The Center is intended to serve several different functions including research and development, investigation of alternative strategies in actual planning problems, community involvement, and dissemination of project reports.

This monograph provides a systematic approach to the problem of planning educational facilities. It first presents a conceptual framework for a general facilities planning and management system called Facilities Resource Allocation Management Evaluation System (FRAMES). The main components of FRAMES are identified as: (1) needs assessment, (2) facilities programming, (3) resource allocation and distribution, (4) facilities management, and (5) evaluation. The report then focuses attention on the needs assessment component and provides a detailed description of a carefully developed and tested needs assessment model. It is hoped that this monograph will be of considerable interest to practicing planners as well as college students interested in facilities planning.

Joseph P. Hannon
Project Director

PREFACE

Mass education has placed an unprecedented demand on the resources of this nation to support public education in its continual demand for modern and increasingly sophisticated educational facilities. The supporters of public education have a right to expect that this consistent demand made on fiscal resources will result in the planning and construction of school plants that will contribute effectively to the mission and goals of public education.

The wise and efficient use of available resources requires a systematic and totally integrated approach to the planning and management of school facilities. The present and future outlook suggests that more effective planning and management procedures must be developed and used if public education is to stay abreast of the shifts, increases and declines in population, the increasing demand for more and better quality education and the accelerated rate of change taking place in all phases of American life.

This monograph deals with the conceptual and practical aspects of providing a systematic approach to the problem of planning and managing educational facilities. It is a beginning effort in the direction of viewing the tasks of planning and managing educational facilities as a total system. The monograph has been prepared with the expectation that its contents will move facilities planning in the direction of considering more carefully the impact of the flow of future events on the development of educational facilities.

C. W. McGuffey

CONTENTS

	Page
FOREWORD	ii
PREFACE	iii
CONTENTS	iv
CHAPTER:	
I. AN INTRODUCTION TO FACILITIES PLANNING	1.1
II. FRAME: A FACILITIES PLANNING/MANAGEMENT SYSTEM	2.1
III. GONA: A FACILITIES NEEDS ASSESSMENT MODEL	3.1
IV. A FACILITIES DATA SUB-SYSTEM TO SUPPORT THE GONA MODEL	4.1
V. OUTPUTS OF THE GONA MODEL	5.1
VI. SUMMARY AND CONCLUSIONS	6.1
APPENDICES:	
A. Sample Maps	A.1
B. Table Shells for Organizing Enrollment Data	B.1
C. Rating Forms	C.1

I

AN INTRODUCTION TO PLANNING FACILITIES

The purpose of this monograph is to describe a process and a way of thinking that was developed to improve the quality of planning and managing educational facilities. The presentation of the process is designed to increase the understanding of the nature of facilities planning and to improve its results.

Success in planning derives from the people who engage in the process; therefore, any process can be only as good as the people who use it. It should be understood, however, that the expertness of those who would engage in facilities planning can be greatly enhanced if the process, techniques and expected outcomes are conceived more clearly. The concepts and ideas presented here should prove useful and helpful in this regard.

Included in this monograph is a general description of a facilities planning/management system. The system is called FRAMES - Facilities Resource Allocation Management Evaluation System. It is presented as a systematic planning and management system with its various components brought together to form a logically conceptual scheme of interrelationships and interdependencies. The concept of allocating and managing resources provided for the planning, construction and use of educational facilities is the principal focus of the system. A more detailed discussion is presented of the needs assessment sub-system and the data

sub-system required to support a needs assessment planning model.

Terminology

Quite often it is difficult to communicate effectively because of the use of unfamiliar words and phrases. Some words appear in this monograph that may be unfamiliar to some readers. Other words used may require operational definitions to clarify their meaning in the context in which they are used. In order to facilitate communication, definitions of selected words and phrases are given.

System

A system is a set of integral, interdependent and interacting elements functioning together to achieve a predetermined purpose or mission. As used here, a school district, a school, or a school building may be referred to as a system; whereas, in fact, each could be considered a sub-system in a more technical sense.

Sub-System

A sub-system is an interdependent element, component or function of a system which is capable of separate identification and description and which contributes to the accomplishment of the total mission of the system. A school is a sub-system of the school district. The structural component is a sub-system of a school building. Other illustrations from education may be identified readily.

Planning

Planning is the process of establishing broad goals, general

objectives and major priorities of a system. To establish goals and objectives, an analysis of current conditions and available resources must be made, problems identified, needs assessed and priorities determined. In selected cases, broad strategies for accomplishing the goals of the system may be prescribed. Planning is the process of determining "what" the system should do and the requirements for the most effective and efficient way of doing what is needed.

Systems Approach

The systems approach is a problem-solving process that emphasizes the identification and resolution of problems. It utilizes a number of problem-solving techniques to determine needs, to identify problems, to choose a solution from among alternative problem-solving strategies, to implement the means of resolving problems and to evaluate results.

Involved in the systems approach is systems analysis. It is the process of identifying the priorities of educational needs in an orderly, objective and systematic manner so that high priority educational problems can be resolved. The process examines the total system by observing its components and their interrelationships. It is a procedure based upon data and analysis rather than intuition.

Model

Models as used in this monograph are representations, simulations, or likenesses of processes, structures or systems which resemble either the object or phenomenon being studied. There are several types such as symbolic, physical and mathematical models. The symbolic model consists of abstract symbols in building the model to represent either the

components or the relationships among the components of an object or phenomenon. An example of a symbolic model is the chart representing the organizational structure of a school district. Mathematical models are symbolic models in which mathematical symbols are used to simulate some theoretical or emperical conceptualization and a formula is used to express the interrelationships of the variables involved. An example of a mathematical model is the relativity model of Einstein. Physical models are replicas which have a similar appearance to the real object. An example of a physical model is the scale model of a schoolhouse or a school bus.

Decision-Making

Decision-making is the process of making a selection from a set of conflicting alternative choices. A decision is the result of the process of making a selection, and it may or may not involve action. If action is involved, the alternative selected should lead to a desirable situation in the future. This points to the need to consider the future consequences of the selection made. One must trace down the consequences of each of the alternative courses of action. The future must be anticipated or predicted in terms of the alternative futures.

Forecasting

Forecasting is the process of predicting some future condition or event. Forecasting differs from both planning and decision-making. Forecasting, however, may be involved in both. Planning uses forecasting to predict what future conditions may exist, what future actions other people may take, or what results may be achieved as a result of

the planning effort. Decision-making uses forecasting to predict the outcomes of alternative courses of action resulting from the selection of a particular choice of alternatives available to the decision-maker.

Alternative Futures

Alternative futures are predicted consequences in the form of events, conditions or outcomes deriving from alternative actions. Of the alternative choices available, one must have some way of knowing what outcomes are likely for each of the actions that could be taken. Past experience or data about the past contributes the information upon which alternative futures may be predicted. The more closely recurring situations resemble past events, the closer one may come to predicting future conditions or consequences that may result from the selection of a specific choice of alternatives.

The Past, Present and Future

Public education has undergone significant change during the last two decades. Public school enrollments following World War II literally exploded as an apparent neverending stream of school children knocked on the schoolhouse door. The birth rate had risen to unexpected highs. The population of rural America moved to the cities leaving behind vacant schools and a need for consolidation. At the same time the schools of suburbia and the central city grew larger and more crowded creating housing problems and a demand for decentralization.

Mass education came into its own with a concerted effort on the part of educational and political leadership to make education serve

the needs of all. The potential of public education is yet to be fully realized but the progression has been from professional education for the few to public education for the many. Today, the schools are closer to the goal of equal educational opportunity for all but there is still much room for improvement and refinements of the system to fulfill this expectation.

The school has become increasingly more sensitive to social and cultural pressures. It has served as society's agent responding to demands to change society's existing functions and conditions and at the same time creating the potential for continuous change.

The services of the school have been extended dramatically in response to societal expectations. The breadth of the curriculum of free public education now runs the gamut from the three R's to vocational training and from pre-school to adult education for no longer are the one-to-twelve program and college preparation the sole champions of public support. It is true that controversy still rages as to what should be taught, to whom and for how long but there is little doubt that a demanding public, no matter how fickle, has faith in public education and will give it the support it really needs to be effective in accomplishing the purposes of society. School leaders, however, can expect the public to be more demanding for greater returns on their investment.

Today, shadows are cast that reflect a slowdown in the growth of public school enrollments. Internal cultural frictions and pressures have stimulated the resurgence of the private school movement in some areas while the availability of resources in others have forced private

schools to close. Population shifts occur at a more rapid rate due to both economic and social forces exerting unrelenting pressure on the traditions and values of the past. These shifts likewise create pressures for new and additional sources of funds for capital expenditures.

The ever-increasing pace at which change takes place has called into question the philosophy and practices of an educational system heavily oriented to the past. While the focus of education has begun to shift more toward the present, the rate of change in all facets of our society suggests that the schools should shift from a concern with the present to a focus on the future. The schools and school systems must make long-range assumptions about the future and generate alternative images about it in order that education can respond effectively to the needs of a society that will inhabit the future.

Change and Facilities Planning

The factors discussed in the preceding paragraphs lend support to the need for the development and use of a more systematic approach to the planning and management of educational facilities. Continuous planning is required to stay abreast of shifts, increases and declines in population whether in the central city, suburbia, or the rural areas. The increasing demand for more and more education on behalf of greater numbers and more groups of people complicate both the planning and management problems. More complicated facilities are needed to satisfy these demands. The accelerated rate of change in population growth, curriculum change and technological development has quickened the pace at which educational facilities must be provided.

The fickleness of the people in providing financial support has complicated the problem of financing and constructing needed new facilities and the modernization of older buildings. Long delays in acquiring needed funds have forced overcrowding and extended use of facilities. Temporary and makeshift solutions and the unpredictable availability of funds have caused many administrators to depend on intuition and "crisis to crisis" management as administrative tools. Planning appears impossible, and long-range planning for capital improvements has been out of the question so it has seemed.

The ever quickening pace at which the future invades the present requires more and more that facilities planners be increasingly capable of anticipating the flow of future events. The future consequences of present decisions must be evaluated continuously for the decision-maker must be prepared to live with those decisions. Future success in dealing with educational facilities problems will depend upon the ability of the planner to assess available options and their alternative futures. A systematic planning/management system should improve the capability of the planner to deal more effectively with the future.

A planning/management system for educational facilities must fulfill certain requirements to be effective. These requirements should include:

1. The system must be responsive to the educational program which it serves.
2. The system must provide the means for the accountability of its effectiveness.

3. The system must provide for the consideration of alternatives in the resolution of conflicting choices.
4. The system must be capable of responding to unexpected and uncontrollable circumstances.
5. The system must anticipate alternative futures and be responsive to them.
6. The system must reflect the consequences of the inter-relationships and interdependencies that relate it to the larger system of which it is a part.
7. The system must place planning and decision-making at the level in the organizational structure where the most relevant and effective decisions can be made.
8. The system must be conceptual in design but practical in its implementation.

The Contents

Chapter I attempted to justify this effort and to lay the groundwork for what is to come in the following pages. Chapter II provides a general overview of the proposed planning/management system. Chapter III explains the needs assessment model which is the initial component of the system. Chapter IV describes the data requirements of the needs assessment model. Expected outputs are described and illustrated in Chapter V. A summary is provided in Chapter VI.

II

FRAME: A FACILITIES PLANNING/MANAGEMENT SYSTEM

The facilities planning/management system was an outgrowth of numerous attempts to conceptualize and to effectuate a methodology that would have general application to large and small, as well as, rural and urban school systems. A planning sub-system has been developed that has worked in widely differing situations with varying degrees of success. Success or failure, however, has not depended upon the system *per se* but more often upon the availability of needed data, the thoroughness of data collection and analysis, forecasting methods used, and the extent of the involvement of school district staff in the use of the system and the interpretation of the findings. Only a skeletal outline of the management component of the system has been developed. The proposed management sub-system has not been tested in practice.

Rationale of the System

Requirements for an effective system were outlined in Chapter I. There are certain postulates, however, that are fundamental to the system and give direction to its development and use. A discussion of these postulates and certain deductions regarding them are presented here.

Postulate One

The school system has a purpose for its existence, and educational

facilities should respond positively and contribute effectively to the accomplishment of that purpose. It was assumed that every school system has a mission and a set of goals and objectives that give direction to the accomplishment of its mission. Such goals and objectives may be written or nonwritten, and they may be understood to varying degrees by the people who operate the system.

It was assumed also that educational facilities exist for a purpose and that purpose should coincide with and contribute to the successful accomplishment of the mission of the school system. The clear identification of goals and objectives and a direct approach to their accomplishment are critical elements in achieving an effective facilities development plan.

Postulate Two

More effective decisions regarding the planning of educational facilities can be made and greater benefits can accrue from their development when facilities programs are considered on a long-term basis. A simple deduction is that a decision made now affects the direction of future decisions. Consequently it is critical that in order to avoid costly errors the consequences of alternative futures must be assessed so that the flow of decisions from the present to the future will be continuous and in the same direction.

The decision to build a school of a specific type and at a given location usually is a commitment for 40 or more years. All subsequent decisions are made as a consequence of the initial ones, and many may be made in an attempt to prove that the initial ones were correct in the

first place.

A second deduction is that long-term planning will contribute to the cost-effectiveness of the facilities planning program. The consideration of alternative futures and the economic consequences will enhance the decision-making process and result in more effective use of available resources.

Postulate Three

Better decisions regarding the development of facilities to fulfill goals and objectives result when the physical requirements for instructional and supporting services are deliberately programmed. Program development is a deliberate process of translating goals and objectives into a structure for program implementation. The systematic consideration of alternative strategies for program implementation and their educational and economic consequences will contribute to the improved quality of educational facilities planning.

Another deduction is the more that is understood about the instructional program and supporting services for which facilities are to be provided, the better the results of facilities programming. While program changes do need to be recognized, it is also important that the facilities programming process anticipate an approximation of the educational program to be housed.

Postulate Four

The demand for resources to develop the most effective school plant is always greater than those available for that purpose. The first deduction is that a school system must plan for the use of its capital

resources so as to obtain the maximum return on the investment. Nothing less than the efficient use of all resources should be anticipated. The school system should be expected to fully account for the results of the investment of time, money, talent, and effort.

A second deduction is that the more efficient the use of resources and the more effective their results, the more likely that required resources will be made available. Evidence of effective results strengthens the confidence of people and encourages their support. Also, more efficient procedures introduced to produce more effective results will produce greater benefits for the same investment. Thus, as the curve of efficiency goes up, there are bigger returns which generate increased confidence on the part of the taxpaying public. The taxpayers, then are willing to invest more in educational facilities.

Postulate Five

The timely delivery of an adequate educational facilities project is the consequence of a totally integrated facilities planning, design and management process. The gap between the discovered need for and the occupancy of an educational facility can be measured by the degree of linearity of the sequencing of occurences in the process of delivering the facility. The more linear the sequencing of critical events the bigger the gap. Thus, it is suggested that careful management of the planning, design and construction processes will provide for a comprehensive, overlapping, non-linear approach to the delivery of a facilities project.

Systematic planning design and management processes are closely

interrelated and are interdependent. Good planning is a prerequisite to good design. Good design can facilitate management, and good management can assure the effective delivery of the sought after product; i.e., a good school building. The recognition of the interdependence of these processes is essential if facilities development is to reach its potential level of effectiveness.

Postulate Six

The effectiveness of the facilities program is the result of the direct functioning of the planning/management system. One deduction is that a systematic approach to planning will produce better results in the development of educational facilities when compared to a more casual, "crisis to crisis," piecemeal approach. It is assumed that the interdependencies of variables must be recognized and the interrelationships of causal factors understood, if the total problem of facilities development is to be adequately solved.

Further, it appears clear that the results obtained from the use of the planning/management system can best be measured by relating outcomes to predetermined goals and objectives. There are two facets to this statement. First, the planning/management system should produce a total facilities development program that will meet the overall goals of the school system. The effectiveness of the facilities program then can be measured in terms of these predetermined goals. Secondly, the performance of individual school buildings in the total program can be measured also in terms of the stated goals and objectives. The contributions are hierarchical in that the individual school facility is a sub-system in the

total facilities system of a school district.

The Concept of Facilities System

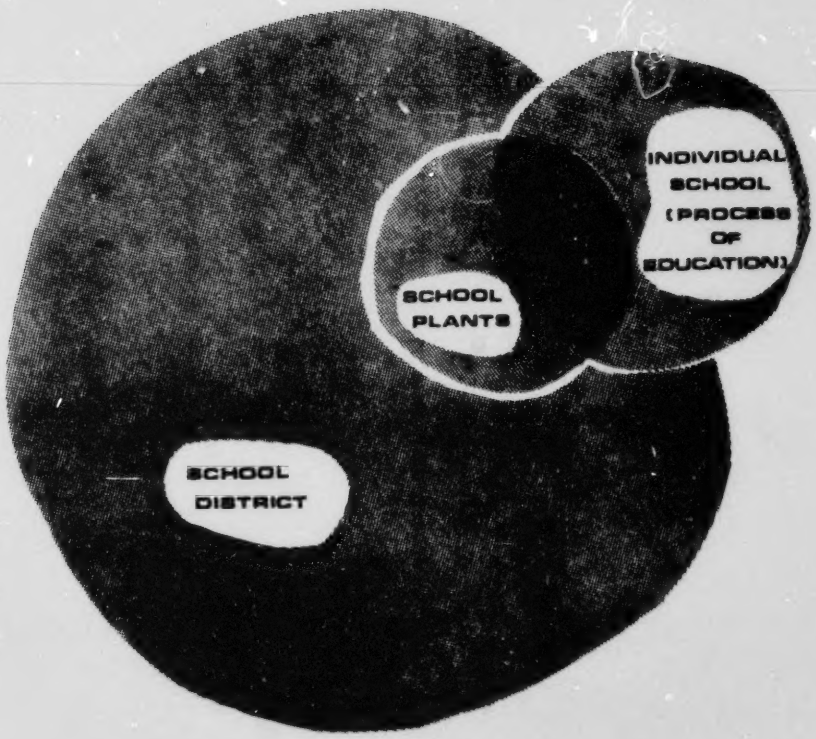
The concept of system as it applies to facilities development assumes that the total set of facilities in a school district is a system. The total facilities program in a district is planned and managed to support the mission of the school district, and therefore, should function as a part of the larger system which is the school district. Individually, school plants are identifiable and functioning elements of the total facilities system and are considered as sub-systems. Figure 2.1 diagrams the placement of the individual school plant in relation to the total school plant of the school district.

Figure 2.2 is an extension of the input-black box-output representation of system. The representation of a generalized educational facilities system overlays a more generalized concept of educational system and is intended to be a simple representation (or model) showing relationship of the components of the system. Inputs are the raw materials (resources) fed into the system, and outputs are the results or products produced by the system. An elaboration of the black box of the system is presented to show the differentiation of the functions of the system.

Educational facilities are operated in an environment which is common to the total educational system. It should be noted, however, that the influences and pressures do not necessarily coincide with those of the educational system but are part and parcel of it.

FIGURE 2.1

Interrelationships of School Plant, School and School District Systems



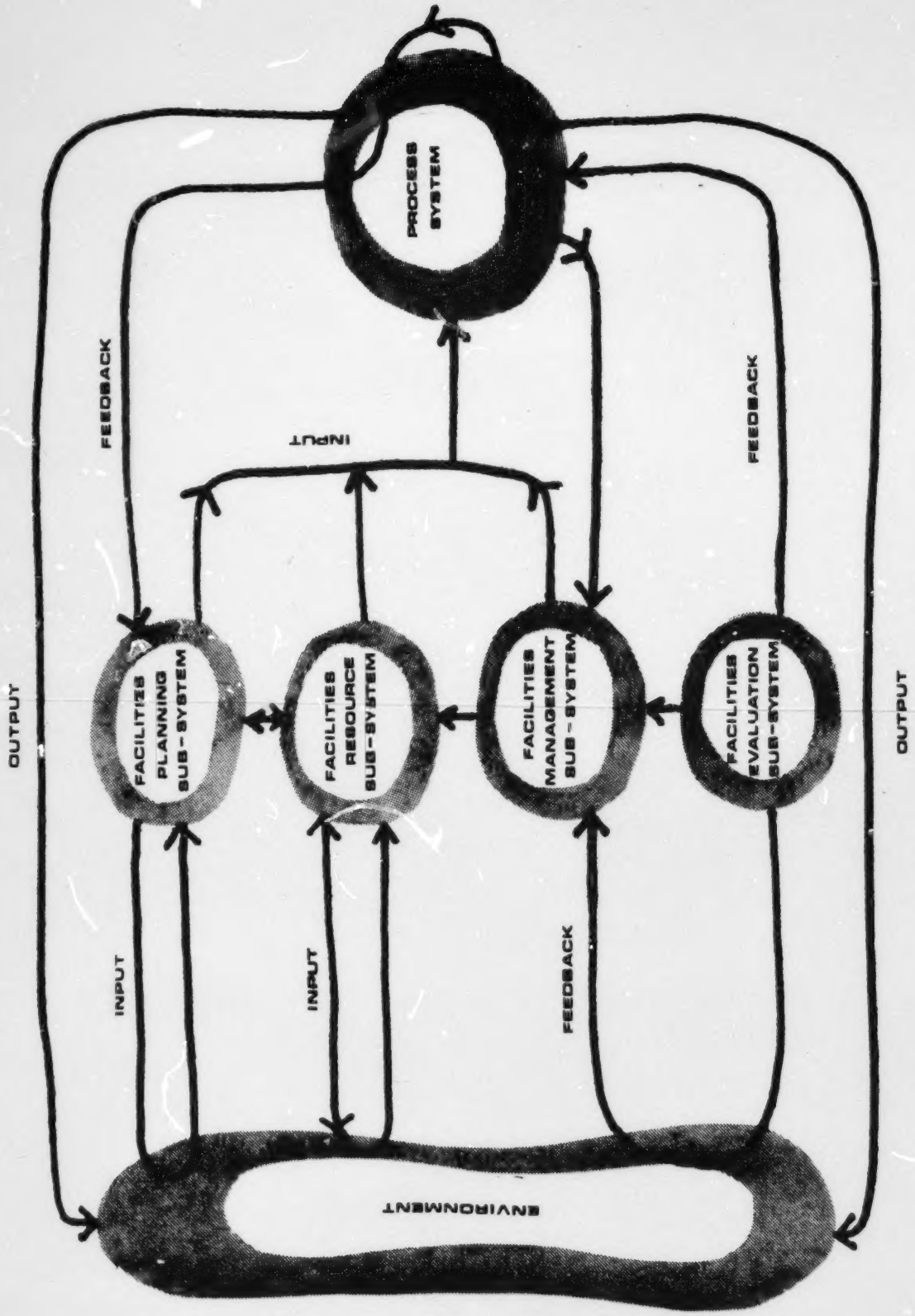


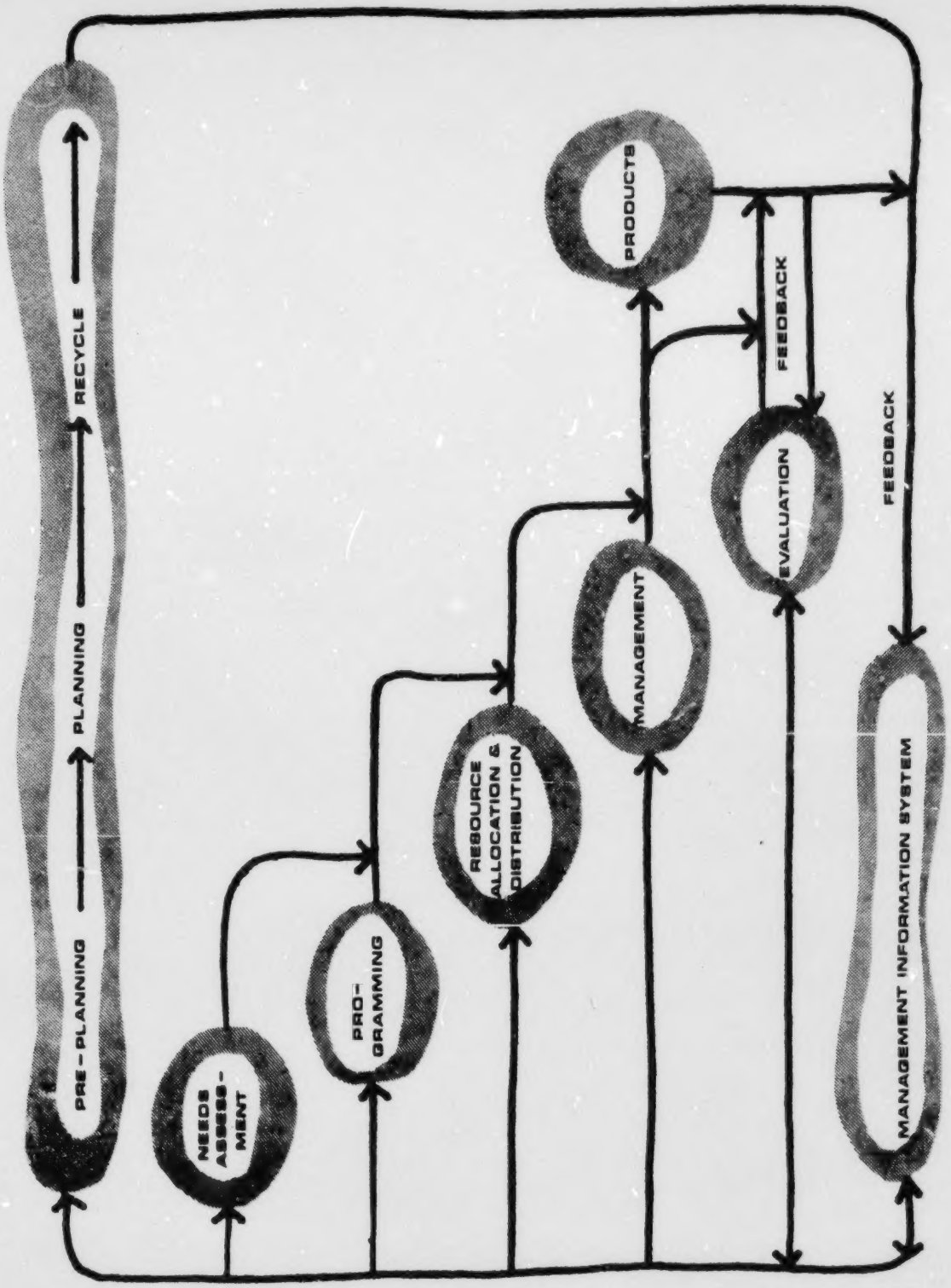
FIGURE 2.2

A Generalized Educational Facilities System

The black box has been divided to include five sub-systems: (1) the planning sub-system, which sets the general direction, orders the priorities and develops plans for implementation; (2) the resource system which generates, allocates, distributes, and monitors the resources; (3) the management system, which organizes, communicates, controls, and sequences the utilization of resources and operates the system; (4) the evaluation system, which assesses the processing of the resources in terms of cost and effectiveness and provides feedback of information into the system to facilitate decision-making; and (5) the process system, which includes the interactions and processes to transform (or change) the input. The arrows indicate the direction of flow of the interactions and relationships of the sub-systems and the environment.

The FRAME System

The major processes of the FRAME System are derived from the Generalized Educational Facilities System. It is proposed for use as a planning/management system for the delivery of educational facilities. The major processes of the system are: (1) needs assessment, (2) facilities programming, (3) resource allocation and distribution, (4) facilities management, and (5) evaluation. Interacting with these processes is the process of planning. A facilities information system supports the total system by providing the data required for each of the processes. Figure 2.3 provides a schematic representation of the relationships and interactions of the processes in the system.



EDUCATIONAL PLANNING/MANAGEMENT MODEL

Planning

Planning was defined in Chapter I as the process of establishing broad goals, general objectives, and major priorities of a system. Planning is hierarchical in that its processes are useful and applicable at various levels of an organizational structure. At the overall system level, broad goals and priorities of the system are the focus of planning which may be referred to as strategic planning. Entry into the system at the operations or implementation level requires more specific planning with a focus on sub-goals, more specific objectives and sub-system tasks. This latter level of planning is referred to as operations planning. The FRAMES Model assumes that planning is continuous and that it occurs at all levels in the hierarchy.

Needs Assessment

A needs assessment model is discussed in considerable detail in Chapter III. A description of the components and the processes are presented.

Needs, as used here, refer to facilities needs. Facilities needs are the measurable discrepancies between existing facilities and those required for accomplishing the mission of the overall system.

Needs assessment is the process of determining the discrepancies that exist between the existing facilities and the best estimate of what facilities are required to fulfill the school's mission. The needs assessment is based on actual inventory and evaluation data for determining the condition of existing facilities and other relevant information regarding what the total system's mission is and what is required

to achieve that mission. The processes involved are analyzing community related problems, inventorying and evaluating existing facilities, projecting pupil populations, assessing requirements of programs and services, projection of facilities needs for new sites, new plants and plant expansions, projecting capital outlay requirements, determining priorities among the projected needs, and establishing goals for fulfilling needs.

Facilities Programming

Facilities programming is the process of determining the facilities required for the support of a particular set of learning objectives, instructional activities and supporting services. Programming processes are usually applied to a specific educational facility prescribed to support a school or other identifiable element in the program structure of a school system. Program goals and objectives, user behavior and functions of space are described and the interrelationship of space elements are illustrated so that the physical means of implementing program activities may be developed.

A number of different models have been used to program educational facilities. The different models are presented to indicate the variety of approaches that have been developed.

Type I Model is the Charrette. It is organized usually as a brainstorming marathon involving local groups of people. It is an organized effort to involve members of the community, bureaucrats, architects and educators in the facilities programming process.

Type II Model is the Squatter's Conference. This model is an intensively organized effort directed by the architect and his design

team to program the facilities and establish the design elements for a school program.

Type III Model is the Planner-Designer-Owner Team Approach. A series of conferences are held to establish the broad program requirements as a basis for designing the facilities for a school project. The team may be led alternately by the owner, planner or designer depending upon the type of planning decisions that must be made.

Type IV Model is the Educational Specification. The educational specification is a document containing written descriptions of the proposed educational program in sufficient detail to clearly state the educational program needs and physical requirements of the facilities proposed to house the educational program. Participation of professional, lay and student groups is desirable. Architects and educational consultants are usually involved.

Type V Model is the classical one in which the programming effort is placed primarily in the hands of the architect. A minimum involvement of the educational leadership and staff are provided.

The programming process should serve a variety of purposes. These should include:

1. Coordinate the facility being planned with the overall system plan for facilities.
2. Develop a facilities program that will facilitate the proposed educational plan.
3. Communicate the physical requirements of the educational program to the architect.

4. Serve as the medium for the faculty and staff to integrate the educational and facilities program into a unified plan of action.
5. Provide a basis for evaluating the performance of the planning and programming processes.

A facilities program plan, when completed, will include information regarding the following:

1. Educational goals and objectives
2. Descriptive summary of the critical program elements
3. Description of teaching and learning activities
4. Assessment of developing trends
5. Statement of human and material resources
6. Description of space requirements
7. Description and diagrams of internal and external space relationships

Capital Resource Allocation and Distribution

The resource allocation and distribution process in the FRAME System involves estimating capital costs on a multi-year basis, assessing the availability of resources to meet needs, the allocation and distribution of resources to programs and projects, the development of a funding plan and the accounting and auditing of resources expended.

Cost Estimates

Cost estimates for capital improvements should evolve from the needs assessment study. Cost estimating models are described briefly in

Chapter III. The use of one or more of these models should generate usable information as to anticipated costs of a proposed facilities program. Continuous up-dating of cost information is essential since both programmatic and inflationary pressures can change the cost picture.

The needs assessment study will also provide an indication of current and projected building needs, as well as an estimate of the time schedule for meeting those needs. This information will guide the preparation of a multi-year financial plan for funding the capital improvement program.

Funding Sources

Capital improvements usually are funded by local taxpayers through general obligation bonds. Some states have distributed grants for capital outlay monies as a part of state education finance programs. Some school districts may qualify for federal grants to construct buildings or provide equipment. In some cases, school districts have surplus properties which may be sold or have access to private sources of gifts, grants or donations. The point is that all potential sources of capital improvement funds should be explored to secure needed funds.

Allocating of Capital Improvement Funds to Projects

The allocation of local capital improvement funds should be based on documented need, project priority level in the hierarchy of needs, a predetermined allocation schedule, project costs and availability of funds. Equity to school clientel would require that the process be systematized and equitably managed through the use of a formula which taken into account the foregoing context variables. Because of priority level or availability of funds, certain projects may be delayed or

postponed indefinately. A multi-year budgeting procedure is needed to deal adequately with the capital improvement problem.

Funding Plan

Alternatives for financing the capital improvement program may be restricted to a set of limited options because of legal constraints. However, there are several local funding models which may be combined to produce a funding plan for the capital improvement program. These models may include the following:

Type I Model is the pay-as-you-go capital outlay model that provides for the use of current revenues to support a continuing construction program. Proceeds from a local tax levy combined with state and federal grants are used to pay the current costs of construction rather than deferring costs to some future date.

Type II Model is the reserve or sinking fund model. Current tax funds levied for capital improvements are placed in a fund to accumulate to pay for construction projects which may be needed in the future.

Type III Model is the generation of funds from the sale of school district general obligation bonds. General obligation bonds are sold in anticipation of revenues to be secured from the levy of a tax on property values in the school district. Funds obtained are used to pay the cost of current construction projects over a period of future years.

Type IV Model is the capitalization of state grants for capital outlay through the sale of revenue certificates by the state on behalf of the local district. The state guarantees that annual grants to the local district for capital outlay will be used to amortize the debt incurred from the sale of revenue certificates.

Type V Model is the lease-purchase plan. Current revenues are used to lease buildings on an annual basis usually with the option to buy at the end of the time when the mortgage is retired. Usually lease payments can be made using current revenues.

Type VI Model would systematically combine two or more of Models I through V to secure the most economical and effective means of funding the long-range capital improvement program.

Debt Service Accounting, Servicing and Auditing

The sale of bonds for capital outlay creates a liability on behalf of of the school district which must be retired according to a planned schedule. The principal of the indebtedness should be retired at a rate at least equal to the depreciation of the assets created by the expenditure.

Income and expenditure transactions relating to the bonds must be recorded in a separate set of accounts. It is imperative that the records of each bond issue be kept in such a way that financial income and expenditures for each can be clearly identified. The receipts of income are deposited in a separate "bond" fund. Expenditures made for construction costs are paid from the Capital Outlay Account of the fund. Payments of principal and interest on the bonds are charged to the debt service account of the fund.

Prudent debt service management will follow legal procedures established for the accounting and auditing of the Capital Outlay and Debt Service Funds. Special accounting safeguards should be implemented which prevent the shifting of building reserves to uses other than for their original purposes.

Facilities Management

Facilities management in the FRAME System requires the use of a systematic approach to the organization, development and implementation of program which includes the following elements:

1. Plant Maintenance
2. Plant Operations including building operation, grounds care and building housekeeping
3. Property Insurance
4. Plant Security
5. Property Records and Reports
6. Plant Rehabilitation and Modernization
7. Plant Utilization
8. Facilities Evaluation
9. New Construction

The functions of facilities management are assumed to include organizing, controlling, decision-making, communicating, directing and coordinating the tasks and personnel who assume the responsibilities and perform the tasks involved in the program. The organization and implementation of the foregoing functions are to be accomplished in accordance with the concepts of management by objectives and the principles of participatory management.

Facilities Evaluation

The purpose of a facilities evaluation is to determine the extent to which facilities goals are met. What goals? Clearly, a set of goals should exist as to what is expected of facilities and the facilities

program of the school district. Goals should be derived from the contribution that facilities are expected to make to the achievement of the overall educational goals of the district.

Such goals should be consonant with instructional goals and will of necessity include the environmental, instructional and behavioral factors that relate to the work of the school. Research has shown clearly that the school plant does affect, for better or worse, the effectiveness of the teacher, the behavior of pupils, the offerings of the school, and the general well-being of all who work in the school.

The process of facilities evaluation should include the following:

1. The fit of facilities to instructional programs and processes.
2. Effectiveness of the performance of interacting physical components.
3. Perceptions of users.
4. Comparative measures of user behavior.
5. Cost-effectiveness.

The facilities evaluation model includes four major components, their interrelations and interdependencies:

1. Facilities Performance
2. Perceptions of Users
3. User Behavior
4. Cost

The processes employed in the use of the evaluation model would include:

1. Identification of goals and objectives.

2. Formulation of criteria for measuring the extent of goal attainment.
3. Selection and/or design of evaluation instruments.
4. Preparation of evaluation design.
5. Collection of evaluation data.
6. Analysis of data.
7. Synthesis of data and interpetation of results.
8. Presentation of findings and results.
9. Recycling as needed.

This process assumes a continuous evaluation process that results in the change of facilities components in response to educational program and user needs.

III

GONA: A NEEDS ASSESSMENT MODEL

The most effective planning begins with a statement of documented needs. Assessment of needs is the first stage in the FRAME System. The needs assessment component of the FRAME System is presented as a framework for accommodating the process, task and data variables involved in planning for facilities development. The processes and tasks involved are distinct from those considered in the planning of a particular educational facility.

The purpose of the model is to provide a systematic approach to determining long range facilities needs and preparing goals and strategies for fulfilling those needs. The letters in the acronym, GONA, represent Goals, Objectives and Needs Assessment indicating the primary functions of the model.

The GONA Model

The GONA Model consists of five major components and three supporting sub-systems. The five major components include the substantive areas which are related directly to the problem of facilities development. These include:

1. Community Aspects
2. Pupil Population
3. Educational Program
4. Existing Facilities

5. Fiscal Aspects

The supporting sub-systems are distinct structural components that are considered necessary for the model to be completely functional. These sub-systems include:

1. The planning process sub-system
2. The facilities data sub-system
3. The planning criteria

Figure 3.1 is a symbolic model representing the interrelationships and interdependencies of the components of the GONA Model. A full discussion of the components of the model and their interrelations is essential to an understanding of the model.

Pre-Planning the Needs Assessment Study

Pre-planning the needs assessment study involves a number of clearly identifiable steps. A brief discussion of these steps will serve to clarify.

Before the study can begin, proper authorization must be obtained from the appropriate governing body to conduct the study. Usually a written statement covering the purpose of the study, a brief outline of the proposed content, a time frame for study completion, some generalizations about procedures to be followed and the identification of those who are to be responsible for the study will be sufficient.

Once authorization to conduct the study has been obtained, a plan of action should be developed to implement the study. The plan of action should include specific study objectives, the identification of critical tasks, procedures to be used in gathering and processing data,

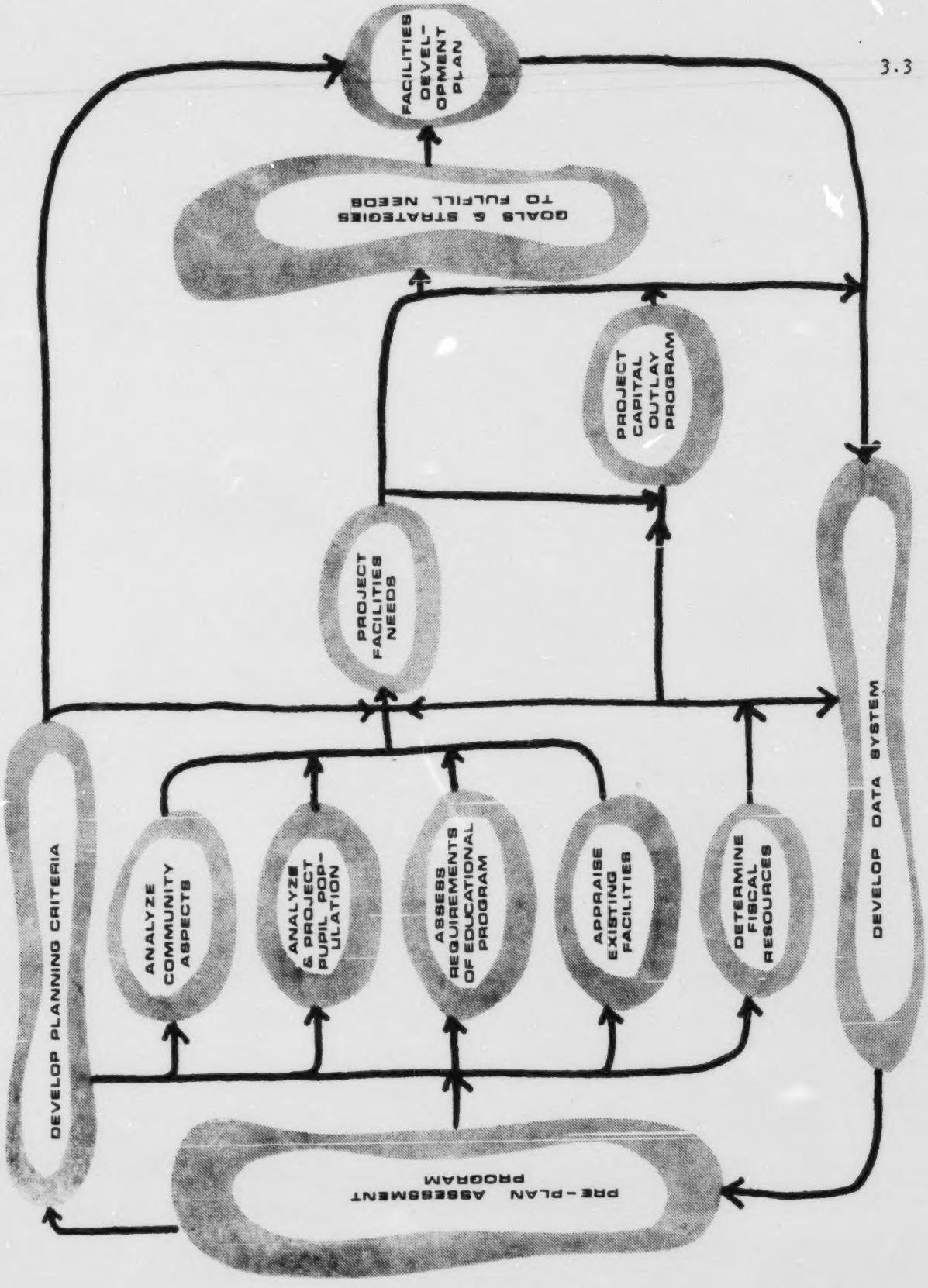


FIGURE 3.1

GONA MODEL FOR PLANNING AN EDUCATIONAL FACILITIES DEVELOPMENT PROGRAM

3.4

organization of the study, staffing assignments and responsibilities, and anticipated date outputs to meet the objectives set for the study.

The time frame for the completion of the study should be analyzed and specific dates set for the completion of the critical tasks involved. A bar chart or other scheduling device can be a helpful aid in the scheduling process.

Alternative methods of organizing to conduct the needs assessment study should be weighed in view of the objectives to be accomplished. If the needs assessment study is being made in anticipation of a bond referendum, the involvement of citizens groups may be a necessity. Models of organization used in conducting a needs assessment study are discussed in the following paragraphs.

Type I Model

This type is called the "Expert" study. A team of experts from the outside are employed to conduct the study. The team may be made up of specialists in a variety of fields such as architecture, sociology, curriculum, engineering, educational facilities and finance. The team conducts its study and compiles a final report to the governing board relative to their findings. The team leaves and the implementation of the study report is left to the local governing body. Needs assessment by the expert team has the advantages of specialization and concentrated attention. On the other hand, a shortcoming is that those who do the study do not implement the findings.

Type II Model

This type of organization is referred to as the "Self Study" Model. The school district's staff organizes its own personnel and assumes

responsibility for conducting the needs assessment study. Outside consultants may be utilized to provide technical assistance and advice in making the study. A number of difficulties arise in this plan. Routine operations can interfere with planning activities and the planning involved may be complex enough to require full-time study. An advantage is that those who do the needs assessment know and understand its findings and are in a position to implement them.

Type III Model

This model is found in use in selected states that are involved in administering state capital outlay programs. A distinguishing characteristic is that local and state levels of educational governance cooperate in completing the tasks involved in the needs assessment study. Either state personnel or personnel selected by the state agency review data collected and compiled by the local school district and together they interpret the findings and document the facilities needs. The local school district organizes to collect and compile data for review by a state committee organized for that purpose by the state agency. This type is called the cooperative-needs-assessment model.

Type IV Model

Needs assessment studies involving citizens groups have been in use for a number of years. The organizational structure includes citizens working with committees which are organized around the five substantive areas discussed earlier plus a steering committee. A common practice is to assign school staff members to each committee to provide technical assistance. Consultants may also be used. This type is called the community-needs-assessment model.

The Substantive Components of the Model

The five substantive components of the GONA Model are discussed in the following paragraphs.

Community Aspects

The purpose of the analysis of community aspects is to identify and describe selected characteristics of the school district being studied. Changing population, economic and social conditions in a school district give rise to changes in school population, characteristics, school curriculum, school locations, building needs and fiscal requirements. The needs assessment should concern itself with collecting information relating to such questions as:

1. What are the growth and mobility patterns of the general population?
2. What are the trends in the development and distribution of housing for residents?
3. What are the growth and mobility patterns of the school-age population?
4. Where is the school-age population located?
5. What is the racial composition of the population and how is it changing?
6. What and where are natural and man-made barriers that restrict population movement?
7. What are present and future expected traffic flow patterns?
8. What are existing and future expected land use patterns?

The findings from this analysis should provide information for decision making relative to determining potential locations for new school centers and need for expansion at existing school sites.

Sources of data include the United States Census Bureau, various city, county and regional planning agencies, state highway departments, and city and county agencies involved with utilities, zoning, and road and street development. Planning aids available from these sources may include:

1. Land use maps
2. Highway and thoroughfare maps
3. Aerial photographs
4. Topographic maps
5. Zoning maps
6. Utilities maps showing water and sewer distribution lines
7. Maps of recreation lands
8. Housing reports
9. General population reports
10. Census reports

Included in the Appendix are maps 3.1 and 3.2 which illustrate the use of pictorial aids to display pertinent data about a particular community. These maps are taken from a study of the facilities in the Atlanta Public Schools.[1]

Pupil Enrollments

The pupil enrollment component provides for an analysis of past and

---

[1] McGuffey, C. W., et al. Educational Facilities Survey, Atlanta Public Public Schools, 1972.

current trends in pupil enrollments. This analysis provides information for decision making relative to pupil loads to be assigned to particular school centers and assists in determining requirements to meet future growth and expansion needs. The number and size of school plants will depend on how many children are to be served and where they are located.

There are at least four dimensions to this component:

1. A ten year data history showing grade by grade enrollment totals for the school district.
2. Current enrollments by grade and by school.
3. Forecasts of enrollments by grade for the school district.
4. Present pupil distribution and forecasts of future pupil dispersion patterns.

Sources of data for the analysis of this component include the files of the school district, the U. S. Bureau of the Census, and state and local public health agencies. Table shells for collecting and organizing needed data are included in the Appendix.

Forecasting future pupil enrollments requires the use of forecasting methods. Several forecasting methods are available from which one can select the most appropriate for the situation and conditions under study. Selected methods are outlined here but not elaborated upon for the reason that more detailed procedures are readily available in other references. Selected techniques are outlined in the following paragraphs.

Enrollment/Population
Ratio Method

This method assumes a constant mathematical relationship between school enrollments and the total general population. This is assumed to

be a good predictor since the school population is a component of the total. A simple application of the technique is to find the average number of children and youth enrolled in school per 1,000 population for the last three or four census years and apply this factor to available forecasts of the future total population in an area. There are some obvious defects in this method caused by changes in population characteristics and in school administrative practices. Furthermore, it is subject to some variation due to changing make-up of the population.

Land Saturation Analysis

This technique assumes the full utilization of available residential lots. In the application of this technique, the number of existing homes is added to the number of estimated future homes. Future home estimates are based on the number of potentially available residential lots. The total number of existing and future homes are multiplied by the average number of children per dwelling as determined by a survey or recent census data. The forecast provides an indication of the total number of children who will be in school when the available land is fully used. Obvious defects in this method result from converting land use from single-family to multi-family dwellings and from residential uses to other purposes.

Pupil-Yield Indices

Studies have shown that different types of housing units systematically yield a different number of children at different levels of schooling. Differences in social, economic and age levels of housing developments apparently account for the variations. Indices may be

developed from data on the number and ages of children, assessed valuation of dwellings or apartment rental costs, type and size of dwelling units and location by census tract. From such indices it is possible to predict the number of school-age children to be expected to attend school from new housing developments.

Linear Regression Method

This method uses historical data. It is based on the assumption that past enrollment patterns will continue into the future. The projection is made by utilizing a statistical formula that relates the predicted enrollments (Y_p) to a specific year (X). A curve of best fit is determined which is called the regression line of Y on X. The standard linear regression formula is:

(1) $Y_p = a + bX$ where:

Y = Enrollments

X = Enrollment year

a = Mean number of enrollments for the years in the historical data

b = The regression coefficient

The prediction equation derived from the raw data can be used to predict future enrollments.

Cohort Survival Method

This method utilizes both the number of live births and historical data on school enrollments to forecast enrollments. A basic assumption in using the method is that the best and most reliable index of the future school population in a school district is the number of live births and the number actually enrolled in the schools of that district.

In applying the method, it is assumed that children born in a given year usually will enter school six years later. A series of ratios is derived by calculating the ratio of the number enrolled in each first grade and the corresponding number of births six years earlier. An average ratio is then derived and applied to the births for the appropriate years to obtain a forecast of first grade enrollment.

In a similar manner to that outlined for the first grade, an average ratio is established between the second and first grade enrollments and applied to the first grade to obtain a forecast of the second grade enrollment for future years. Similarly, a ratio is established for enrollments in each remaining grade and applied to the number of children in each succeeding grade to project enrollments for all grades for a five-year period. As an alternate to using an average survival ratio, linear regression may be used to predict survival rates.

Experience over a long period of time indicates that the use of the Cohort Survival Method underestimates enrollments in a fast growing district. It has a high degree of dependence, however, in a school district with a stable population. Abrupt changes in certain factors such as the number of births or migration can cause discrepancies. There is a need for continuous reappraisal of population forecasts to avoid the accumulation of error due to unexpected occurrences.

Forecasting Enrollment for the GONA Model

A forecast of pupil enrollment is essential to the completeness of the GONA Model because future enrollments are an essential ingredient in projecting facilities needs. A computer program has been prepared for use in making enrollment forecasts by computer. The computer program is

designed to use the Cohort Survival Method. Other methods are selected for use when the required data are not available to support the use of the Cohort Survival Method.

Pupil Enrollment Dispersion Patterns

Alternate approaches to the assessment of pupil dispersion patterns should be considered. The purpose of this analysis is to learn where children live so that the location and density of the pupil population can be studied. Information generated by this analysis provides guidance for decision making about potential shifts of pupils to alternate school centers either to relieve overcrowding or to maximize building and classroom utilization. The analysis can also be useful if a school building is closed and its pupil enrollment requires reassignment to other school centers. The information generated will also be useful in locating permanent school centers and revising school attendance area boundaries.

Two techniques useful in making the analysis are the pupil spot map and the number and percentage of pupils by age group compiled according to census tract.

The spot map is the most commonly used device for analyzing pupil density and dispersion. A map of appropriate scale is marked to indicate the home of each pupil. All grade levels are usually included except that separate grade groups, elementary, middle and secondary pupils are usually shown on separate maps. A large scale map is needed in order to provide enough space to include a spot for every pupil. Each school is located by using a distinct symbol to distinguish among elementary, middle and secondary schools. The north arrow and map scale should be shown on the map. Contrasting colors such as red, blue, green, and black

should be used to show each grade. Attendance area boundaries should be drawn on the map.

The number and percentage of pupils by age group should be compiled by census tract as an additional means of analysis. In most areas, these data are not available except at ten year intervals. Some planning agencies attempt to maintain up-to-date data annually. The availability of these data can add greatly to the analysis of dispersion patterns of the pupil population.

The Educational Program

The GONA Model does not purport to make a detailed analysis of the educational program. Effective educational facilities planning can be accomplished only if the policies, practices and projected plans of the educational program are understood. Therefore, the purpose of this analysis is to review and identify the key curriculum and instruction factors and supportive services that generate facilities needs and requirements. The information required for this level of decision making is more general than specific since major policy level decisions are involved. More specific and detailed information is needed for individual school facility needs assessment and planning.

The following dimensions should be considered;

1. Philosophy and goals of the school district
2. Existing program structure including both vertical and horizontal organization and curriculum structure
3. Curricular offerings by grade level and relative emphasis given to particular instructional content and methods.

4. Availability of supporting and auxilliary services
5. Availability of learning aids and equipment to schools
6. Type and size of school units
7. Number and type of non-instructional and supporting personnel available to schools
8. Teacher load and class size by grade level
9. Ratios of course enrollments to total enrollments in secondary schools
10. Anticipated changes in the educational program

The findings from the educational program analysis should provide basic information to assist in establishing models for the number and type of facilities required for the different types and levels of school units. When the staffing of the schools, course offerings, program structure, supporting services and so on are known, more effective decisions can be made regarding the adequacy of existing buildings and the need for building additions to provide for program expansion and improvement.

Data needed for this analysis can be found either in the files of school district offices or the records of individual schools. Processing of data can be accomplished by computer in larger school districts. Critical policy statements should be available in governing board minutes or printed documents of the school district.

Appraisal of Existing Buildings

The needs assessment will include an appraisal of existing buildings. The purpose of the appraisal is to determine how well the school plant of the district is serving its functions. The appraisal should be made in

terms of both the adequacy of the educational and environmental factors which affect the functioning of the school.

The appraisal is divided into two components for purposes of discussion. One is the qualitative appraisal which relates components of facilities to definitive standards. The other is the quantitative appraisal which is an inventory process designed to generate information as a basis for estimating the capacity of each school plant.

The Qualitative Appraisal

The qualitative appraisal is designed to estimate the educational adequacy of the various building and site components. A rating form is used to record the evaluations made of sites, buildings, rooms and spaces at each school center. The use of the rating form is coordinated with a set of acceptable criteria or standards which guide the evaluator in making judgments about the adequacy of the components being assessed.

The site rating form provides for the evaluation of the following features:

1. Location
2. Drainage
3. Environment
4. Safety
5. Size
6. Terrain
7. Drives
8. Parking
9. Landscaping
10. Playground

11. Bus Loading
12. Athletic Fields
13. Utilities
14. Traffic
15. Access

The building rating form provides for the evaluation of the following set of building sub-systems:

1. Structure
2. Exterior Walls
3. Interior Partitions
4. Heating, Ventilation, Air Conditioning
5. Fenestration
6. Safety Facilities
7. Roof/Insulation
8. Electrical System
9. Plumbing System
10. Sanitary System
11. Ceiling/Lighting System
12. Floors

The rating scale used for the site and building rating forms are as follows:

1. Missing

   Feature is needed but is missing.

2. Inadequate

   Feature clearly does not meet standards and is functioning poorly.

3. Marginal

   The feature does not meet standards. It permits limited use but restricts performance.

4. Adequate

   The feature meets acceptable criteria or standard and is functioning well.

5. Superior

   The feature is clearly in excess of the standard and is functioning exceptionally well.

The space rating form provides for the evaluation of the following features:

1. Room Type
2. Design Use
3. Floor Area
4. Interior Finish
   - Walls
   - Floors
   - Ceiling
5. Lighting
   - Artificial
   - Natural
6. Heating
7. Cooling
8. Ventilation
9. Chalkboard
10. Tackboard
11. Storage
    - Shelves
    - Cabinets
    - Other
12. Room Classification
13. Furniture/Equipment

The space rating form serves both as an appraisal and inventory form. The five point rating scale used with the site and building forms is used with the space form. In addition, codes are used for

room type and room classification features, and other entries called for on the form are completed.

Only scores on individual items of the rating scales are used in the assessment. Total scores are of no value. However, scores of individual features of a school plant may be compiled into a profile. Strengths and weaknesses of the various features of the school plant are compiled. The compilation provides information for decision making about needed school plant improvements. Rating forms are included in the Appendix.

The Quantitative Appraisal

The object of the quantitative appraisal is to determine an estimate of school plant capacity. School plant capacity is an estimate of the number of pupils who can be accommodated without crowding in a school plant and varies according to operating policies and practices of the school. Such factors as class size, extent of utilization, size of teaching spaces and scheduling practices will affect the school plant capacity estimate. Several capacity models are in use. However, most require the computation of room capacities before total plant capacity can be calculated. Selected room capacity models are discussed here.

Type I Model. This type is the teacher-pupil load model. The standard pupil load for a teacher is used as the room capacity.

Type II Model. This type is the square-feet-per-pupil model. A standard space allocation is made for each pupil station. The amount of square feet in a teaching space is divided by the per pupil standard and the result is the estimate of room capacity.

Type III Model. This type is a mathematical model which includes a combination of the factors included in the Type I and Type II Models. The mathematical model is as follows:

$$C_i = \frac{a\ X_i}{b_i}$$ where:

C_i = Capacity of an instructional space

a_i = Teacher-pupil load

b_i = Square foot standard for an instructional space

X_i = Actual amount of square feet in an instructional space

After an estimate has been made of individual space or room capacities, the total capacity of a school plant can be computed by using the mathematical model presented here.

(1) $$C_p = U \sum_{i=1}^{n} C_i$$ where:

C_p = Estimate of total school plant capacity

U = Utilization factor

C_i = Capacity of each instructional space in the school plant according to Type III Model

The formula generates the capacity of a particular school plant by computing the capacity of each instructional space using the Type III Model, adding these together and multiplying by a standard utilization factor.

The capacity of the school plant should match use demands. Each room and space should have an optimum usage for each period in the class schedule. Two types of utilization affect capacity--teacher station and pupil station use. The school plant has a given number of rooms or teaching stations. If all rooms are in use during the day, there is 100 percent utilization. If they are in use for one-half of the school day, there is 50 percent utilization. The formula is simply the number of periods a teacher station is used divided by the number of periods available. It is possible for all rooms of a school plant to be in use every period during the day, yet have unused capacity. A room may have 30 seats but only 24 may be occupied each period during the day, yielding an 80 percent pupil-station utilization. The general formula is actual use divided by potential use yields the appropriate utilization factor. Utilization will vary from room to room because class sizes may not always fit room sizes. A uniform use factor is needed to adjust absolute capacity due to the inability to achieve 100 percent utilization.

The quantitative appraisal will accumulate the data required to compute room capacities, utilization factors and the total capacity of each school plant. This requires the systematic inventory and evaluation of each space in each school plant. Additionally all temporary, makeshift and obsolete spaces should be purposefully excluded from the final inventory.

Fiscal Aspects

This component of the GONA Model provides for an analysis of the fiscal requirements and the available resources needed to support the long-range capital improvement program. The three dimensions of this component are: (1) an estimate of capital improvement costs, (2) a complete assessment of the potential funds likely to become available from all sources which may be used for capital improvement purposes, and (3) the funding plan.

Estimating Capital Improvement Costs

Estimating the cost of capital improvements requires the input of information from a variety of sources and, at best, the result obtained will be only an approximation. Experiential data from other similar projects, advice of architects and contractors and consultative assistance from construction cost estimators should be utilized.

Construction cost estimates of a preliminary nature may be made utilizing the cost estimating model discussed here.

The generalized cost estimating model is:

(1) $C_c + C_m + C_o = C_T$ where:

C_c = Is the cost of new construction

C_T = Represents the total cost generated by the model

C_m = Represents the estimated cost of modernizing existing school plants

C_o = Represents other costs to be added such as professional fees, equipment, furnishings, bond costs and administrative costs

This model is supported by an estimate of new construction costs which may be determined by utilizing one or more of the following cost

estimating models:

Type I Model. This model utilizes the cost-per-square-foot approach. Estimates of space needs are made for elementary schools and secondary schools, separately, and these are multiplied by the cost per square foot of each type of space to arrive at the total cost. This is justified on the premise that construction costs differ between elementary and secondary schools.

The mathematical model is:

(1) $C_E S_E + C_H S_H = C_c$ where:

C_E = Is the cost-per-square-foot for elementary construction

S_E = Is the number of needed square feet for elementary school construction

C_H = Is the cost-per-square-foot for secondary school construction

S_H = Is the number of needed square feet for secondary school construction

C_c = Is the total cost of new construction

Type II Model. This model utilizes the cost-per-pupil approach. Experience has shown that the per pupil cost for constructing facilities for elementary school purposes varies somewhat from the cost of secondary school construction. The application of the method utilizes a per pupil cost derived for elementary and secondary pupils separately which is then multiplied by the number of pupils in excess of existing plant capacity for each category. The model is expressed in the mathematical formula:

(2) $C_E P_E + C_H P_H = C_c$ where:

C_E = Is the cost per pupil for an elementary pupil

P_E = Is the number of unhoused elementary pupils to be housed in new construction

C_H = Is the cost per pupil for a secondary pupil

P_H = Is the number of unhoused secondary pupils to be housed in new construction

C_c = Is the total cost of new construction

Type III Model. This model utilizes the variable cost-by-type-of space approach. This model is based on the premise that each different type of space in a school plant generates a different cost. This may arise from the need for more utilities in a given area within the plant, a higher ceiling, more built-in equipment and so on. An example is that a kitchen costs more to construct than a classroom. The mathematical model for this approach is expressed as follows:

(3) $C_c = \sum_{i=1}^{n} C_i N_i$ where:

C_c = Is the total cost of construction

C_i = Is the cost for any type of space

N_i = Is the number of square feet of any type of space including all types to be found in a school building.

Sources of Funds

All sources of funds for capital improvements should be located and an assessment made as to their availability for the financing of the capital improvement program. Local, state and federal funds, sale

of surplus properties and grants from foundations should not be overlooked. The availability of funds from the various sources will determine the final plan for funding the proposed program.

Funding Plan

The funding plan for implementing the capital improvement program is an optional element of the GONA Model. However, the needs assessment will include the need for funds but may or may not provide an assessment of the alternative funding options open to the school district. Models of funding strategies were discussed in Chapter II.

The Supporting Sub-Systems

The GONA Model utilizes three supporting sub-systems which include:

1. Facilities Data Sub-System
2. Planning Criteria Sub-System
3. Planning Process Sub-System

A discussion of these sub-systems follows.

Facilities Data Sub-System

The development of a facilities data sub-system is a necessity if the GONA Model is to function effectively. The data system may be formalized and computerized or it may be a manual system. In either case the data system should contain those data about facilities that are essential to the needs assessment process. The Facilities Data Sub-System Model is discussed in Chapter IV.

Planning Criteria
Sub-System

The needs assessment study involves a number of decisions concerning the adequacy of existing facilities, needed improvements to new schools, location of new schools, number and types of facilities for new schools and additions, size of schools and feeder school patterns. A set of guidelines for making value judgments is essential to give direction to the decision-making process regarding the foregoing matters.

Guidelines are not presented here. Only the factors which require guidelines are indicated. Each school district should determine the substance of these guidelines since the "goodness" of a particular criterion is a matter for interpretation and will depend upon policies, practices and standards in a particular locale. The factors for which criteria should be developed include:

1. Class size
2. School plant capacity
3. Plant conversion or abandonment
4. Feeder school patterns
5. School plant size
6. Grade organization
7. Location of new schools
8. Size of school sites
9. Environmental performance standards for lighting, acoustics, heating, cooling, and sanitation
10. School plant safety
11. Pupil travel distances
12. Attendance patterns

13. Comprehensive facilities model for each type of school
14. Space utilization
15. Space requirements
16. Cost limits

Numerous sources are available for obtaining specific criteria. These will include state educational agencies, professional associations, accrediting agencies and many publications in the professional literature.

The Planning Process Sub-System

The process of making a needs assessment involves a series of sequential but related and interdependent procedures designed to determine needs and develop goals and objectives to meet those needs. The following procedures outline the needs assessment process as utilized in the GONA Model:

1. Authorize the needs assessment study
2. Pre-plan the study
3. Prepare an organization plan for the study
4. Obtain approval of the needs assessment plan and the organization for implementing the study
5. Gather data that relate to the substantive areas of the study
6. Organize and analyze the data
7. Develop and seek approval of the criteria
8. Apply the criteria and synthesize the data to determine current facilities needs

9. Project facilities needs for the long-range period under study
10. Assess fiscal support needed
11. Prepare goals, objectives and strategies in the form of a long-range master plan
12. Test the plan
13. Refine the plan, if needed
14. Obtain approval of the plan
15. Communicate the plan
16. Implement the plan
17. Recycle planning as needed.

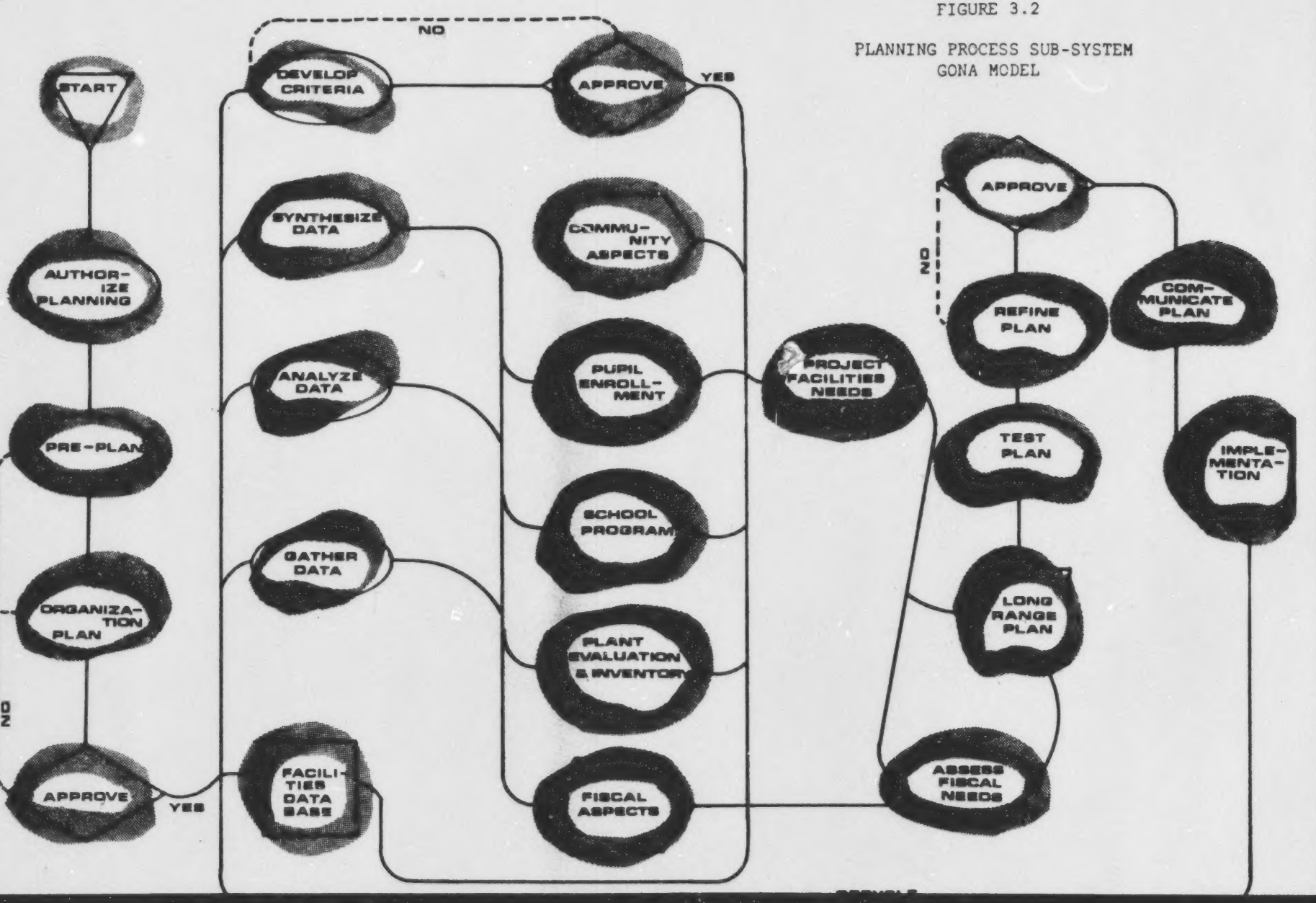
Figure 3.2 is a representation of the precedures outlined in the foregoing paragraphs. The results of the needs assessment process culminate in the compilation of needed facilities in the form of a long-range master plan which is tested, refined, approved and implemented. The plan should be a set of goals, objectives, priorities and alternative strategies for meeting the needs for facilities in the foreseeable future.

Summary

The purpose of a needs assessment model is to document facilities needs in a systematic way. GONA is a particular needs assessment model consisting of five substantive and three supportive sub-systems. The nature of the substantive and supportive sub-systems has been discussed. A planning process model was presented as a means of gathering, organizing and synthesizing appropriate data to indicate needs for facilities

FIGURE 3.2

PLANNING PROCESS SUB-SYSTEM
GONA MODEL



improvement. The results of the needs assessment process are compiled into a long-range master plan which outlines goals, objectives, priorities and strategies for improving educational facilities.

IV

A FACILITIES DATA SUB-SYSTEM TO SUPPORT THE GONA MODEL

An adequate data system is essential to the effectiveness of the GONA Model. The purpose of this section is to describe the Data Sub-System. The specific objectives are as follows:

1. To identify facilities data items that are essential to the support of the needs assessment model (GONA).
2. To classify, describe and define the data items.
3. To present an orderly data collection and recording method which will allow the processing and retrieval of the data.

The Components of the Sub-System

The data required for the GONA Model are structured into four components. These components include:

1. Site Data File
2. Building Data File
3. Space Data File
4. Enrollment Data File

Four records make up the data file. These four records are:

1. Site Record

   This record is made for each parcel of land owned by the school district which describes its general characteristics such as location, size, access, terrain, environment, and so on. Form A, Site File, is a copy of this record.

2. Building Record

   This record is made for each building and building addition used by the school district which describes selected characteristics of buildings and additions on a specific site. Form B, Building File, is a copy of this record.

3. Space Record

   This record is made for each room or space within a building unit and describes selected characteristics of the space. Form C, Space File, is a copy of this record.

4. Enrollment Record

   This record is made to include the active enrollment for each grade assigned to an organizational unit. Form D, Enrollment File, is a copy of this record.

Data Items: Codes and Definitions

The data items that make up the sub-system data files include descriptors and evaluations of the site, building, space, and enrollment

components. Definitions and codes for data items that make up the data files are discussed in the following paragraphs. USOE Handbook definitions are used as the point of departure for definitions with slight variations in some cases.

Site Data: Codes and Definitions

Form A is the site record designed to receive data about parcels of land that make-up the site.

Site. The site for an organizational unit consists of all the land and parcels of land serving that unit including all improvements thereon such as grading, drainage, drives, parking areas, walks, plantings, play courts, and playfields. A site for an organizational unit may be composed of several parcels.

Parcel. A parcel is a separately identifiable piece of land which is non-contiguous to and may be remote from other parcels assigned to an organizational unit. Parcels may or may not have buildings located on them. One or more parcels may constitute a site.

Card Code. A two digit code is provided which allows expanding the number of cards to as many as 99 for each different site.

District Number. A three digit code is assigned to a school district to distinguish it from other school districts. The three digit number should correspond to the State assigned number if there is one.

FORM A

REF: EFPC 001

SITE FILE

1. CARD CODE (1–2)
2. DISTRICT NUMBER (3–5)
3. SITE NUMBER (6–8)
4. PARCEL NUMBER (9–11)
5. ORGANIZATIONAL UNIT (12–14)
6. SCHOOL NAME (ABBREVIATE) (15–26)
7. GRADES
   LOWEST (27–28) HIGHEST (29–30)
8. STREET NUMBER (31–35)
9. STREET NAME (36–47)
10. CITY (48–55)
11. OWNERSHIP (56–57)
12. YEAR ACQUIRED (58–62)
13. ACREAGE (63–66)
14. YEAR DISPOSED (67–68)
15. PRIMARY USE (69–70)
16. WATER (71)
17. SEWERAGE (72)
18. PLAYGROUND (73)
19. LANDSCAPING (74)
20. DRAINAGE (75)
21. PARKING (76)
22. SAFETY (77)
23. TERRAIN (78)
24. ENVIRONMENT (79)
25. LOCATION (80)
26. ACCESS (81)
27. BUS LOADING (82)
28. ELECTRICAL SERVICE (83)
29. TRAFFIC CONTROL (84)
30. ATHLETIC FIELDS (85)
31. EXTERIOR LIGHTING (86)

Site Number. A three digit number is used to identify the parcel of land upon which an organizational unit is located. Each parcel of land with an organizational unit located on it should be assigned a unique number and assigned a parcel number as well. Consecutive numbers are assigned from 001 to 999.

Parcel Number. A unique number composed of three digits is used to identify the parcels of land owned or used by the school district. This number is used to identify all parcels of land under the control of the school district. Numbers are assigned consecutively from 001 to 999.

Organizational Unit. A three digit number is used to identify the separate and distinct organizational units which comprise the school district. An organizational unit is a component of the school district organizational structure which has control and responsibility of people and property. Examples are schools, the superintendent's office, the maintenance department, and so on. Numbers are assigned consecutively from 001 to 999.

School Name. The name of the school should be identified by use of the 12 digit spaces provided on the form. If the full name of the school cannot be entered in the spaces provided, abbreviations should be used.

Grades. Four digits are used to indicate the lowest and highest grades assigned each separate parcel of land. The first two digits should be used to identify the lowest grade and the last two digits the highest grade.

Street/Grid Number. A five digit code is used to indicate the street number in the address of the school. If street number is not available then a grid number or other map location identification number may be used. Otherwise omit the data.

Street Name. A twelve digit code is used to indicate the name of the street on which the parcel is located. If location is not on a street, then road or highway name should be used. Otherwise omit the data.

City. An eight digit code is used to indicate the name of the city, town, or village of parcel location.

Ownership. A two digit code is used to indicate ownership. The code should be selected from the following:

(01) Federal
(02) State
(03) County
(04) Municipal
(05) Authority
(06) School Board
(07) Private
(08) Combination
(09) Other

Year Acquired. A three digit code is used to indicate year and month that parcel was purchased or otherwise acquired for use.

Acreage. A four digit code is used to indicate the total acreage of parcel to the nearest acre.

Year Disposed. A three digit code is used to indicate year and month parcel was sold or otherwise disposed of.

Primary Use of Parcel. A two digit code is used to indicate the primary use of the parcel. The code should be selected from the following:

(01) District Administration
(02) Day School
(03) Adult Center
(04) Vocational Center
(05) Special Purpose Center
(06) Maintenance Center
(07) Transportation Center
(08) Warehouse
(09) Food Service Center
(10) Stadium
(11) Community Center
(12) Instruction Center
(13) Playground
(14) P. E. Facility
(15) Joint Use with Other Public or Private Agency
(16) Combined School Use
(17) Vacant
(18) Other

Water. A single digit is used to indicate the source of water supply. The code is selected from the following:

(1) Public System
(2) Private System
(3) On-site Well System

Sewerage. A single digit is used to indicate the source of sewage treatment. The code is selected from the following:

(1) Public System
(2) Private System
(3) On-site System

Playground. A single digit is used to indicate the extent of development of the playground area. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Landscaping. A single digit is used to indicate the extent of development of the landscaping of the parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Drainage. A single digit is used to indicate the extent of development of the drainage of the parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Parking. A single digit is used to indicate the extent of development of the parking on the parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Safety. A single digit is used to indicate the degree of safety of the on-site conditions and the safety of the ingress and egress to the site. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Terrain. A single digit is used to indicate the general character of the terrain of the parcel. The code is selected from the following:

(1) Rough Terrain
(2) Slightly Concave
(3) Slightly Convex
(4) Rolling
(5) Flat

Environment. A single digit is used to indicate the adequacy of the man-made environment which surrounds the parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Location. A single digit code is used to indicate the adequacy of the location of the parcel to serve the pupil population assigned to the school center to which the parcel belongs. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Access. A single digit code is used to indicate the extent of adequacy of the roads, streets, highways and sidewalks in getting vehicular and pedestrian traffic to the parcel. The code is selected

from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Bus Loading. A single digit code is used to indicate the adequacy of the facilities provided for the purpose of loading and unloading school pupils at the school. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Electrical Service. A single digit is used to indicate the adequacy of the electrical service at the parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Traffic Control. A single digit code is used to indicate the adequacy of the measures used to control traffic at the points of egress and ingress and adjacent to the parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Athletic Fields. A single digit code is used to indicate the extent of development of athletic fields located on a parcel. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Exterior Lighting. A single digit code is used to indicate the level of adequacy in the provision of lighting for parking areas, sidewalks and approaches to buildings and building perimeters. The code is selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Building Data: Codes and Definitions

Form B is the building record designed to receive data about buildings on the site to support the school or other organizational unit.

Card Code. The two digit code is provided to indicate the number of cards used for each building. The data on each building could be expanded to include up to 99 cards.

District Number. A three digit number is provided to receive the district code.

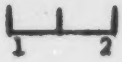
Parcel Number. A unique number of three digits is used to identify the parcel of land on which the building is located.

FORM B

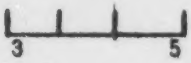
REF: EFPC 002

BUILDING FILE

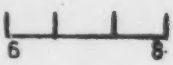
1. CARD CODE



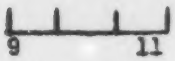
2. DISTRICT NUMBER



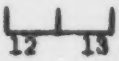
3. SITE NUMBER



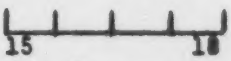
4. PARCEL



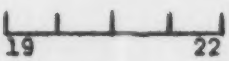
5. BUILDING NUMBER/ADDITION



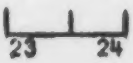
6. ORGANIZATIONAL UNIT



7. YEAR CONSTRUCTED



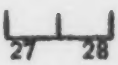
8. PRIMARY USE



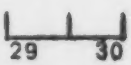
9. NO. STORIES

10. PLAN TYPE

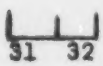
11. STRUCTURE



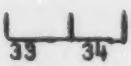
12. EXT. WALL



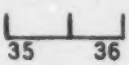
13. FENESTRATION



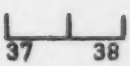
14. HEAT TYPE



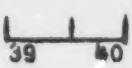
15. HEAT DISTRIBUTION



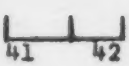
16. COOLING TYPE



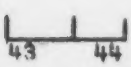
17. VENTILATION



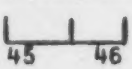
18. INTERIOR PARTITIONS



19. ROOFING

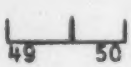


20. ARTIFICIAL LIGHTING



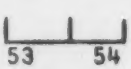
21. ELECTRICAL

22. PLUMBING

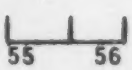


23. FIRE ALARM

24. AUTO SPRINKLER

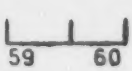


25. EMERG. LIGHTING



26. FLOORS

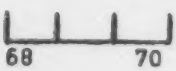
27. SANITARY SYSTEM



28. BUILDING CLASS

29. FLOOR AREA

30. NO. OF TEACHER STAS.



31. NO. OF PUPIL STAS.

Site Number. Three digit places are to provide for the use of a three digit site number.

Building Number/Addition. A two digit code is provided to indicate the unique number assigned to each building on the parcel of land identified by the above parcel code. An existing number may be assigned provided it is part of an existing system of building numbers. Otherwise, assign a unique number to each building on each separate parcel of land.

The third digit is used to indicate the code number of additions to the building identified by the building code. The additions, if more than one, would be assigned a code sequentially from one through nine. A separate card is used for each addition.

Organizational Unit. A four digit code is used to identify each separate and distinct organizational unit such as a school.

Year Constructed. A four digit code is assigned to indicate the year construction was completed on the building.

Primary Use. A two digit code is used to indicate the primary use of each building or addition. The code should be selected from the following:

(01) Administration
(02) Vocational
(03) Food Service
(04) Physical Education
(05) Library/Media Center
(06) Kindergarten
(07) Elementary
(08) Middle
(09) Junior High
(10) Senior High
(11) Stadium
(12) Combination
(13) Other

Number of Stories. A single digit code is used to indicate the number of stories. If ceiling heights is less than six feet, six inches in a basement level, do not count as a story. Otherwise count a basement as a story.

Plan Type. A single digit code is used to indicate the type of architectural plan of the building located on a parcel. Code for plan type should be selected from the following:

(1) Finger Plan
(2) Loft Plan
(3) Campus Plan
(4) Cluster Plan
(5) Traditional Plan
(6) Other

Structure. A two digit code is used to indicate (1) type of structure, and (2) condition of structure. The first digit code should be selected from the following:

(1) Load-bearing - Masonry
(2) Non-load-bearing - Masonry
(3) Non-load-bearing Steel
(4) Combination Steel and Masonry
(5) Load-bearing - Wood Frame
(6) Other

The condition of structure should be indicated by one of the following codes:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Exterior Wall. A two digit code is used to indicate (1) type of exterior wall, and (2) condition of the exterior wall. The first digit

of the code indicates the type of materials used in the exterior wall. A code should be selected from the following:

(1) Masonry
(2) Brick
(3) Hollow Tile
(4) Block
(5) Stucco
(6) Metal
(7) Panel Wall
(8) Wood
(9) Other

The second digit code should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Fenestration. A two digit code is used to indicate (1) the type of materials used in exterior windows, and (2) the condition of windows. The first digit code should be selected from the following:

(1) Wood
(2) Painted Steel
(3) Aluminum
(4) Galvanized Steel
(5) Other

The second digit code should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Heat Type. A two digit code is used to indicate (1) the type of heating system, and (2) the condition of the system. The code for type of heating should be selected from the following:

(1) Central
(2) Zone
(3) Multi-Zone
(4) Individual Room Units
(5) Mixed
(6) Other

The code for the condition of the system should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Heat Distribution. The medium used for distributing heat to rooms and spaces and its adequacy are represented by a two digit code. The first digit should be selected from the following:

(1) Steam
(2) Hot Water
(3) Hot Air
(4) Radiant Energy
(5) Other

The adequacy of the medium should be indicated by the following codes:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Cooling Type. A two digit code is used to indicate (1) the type of cooling system, and (2) the condition of the system. The first digit code should be selected from the following:

(1) Central
(2) Zone
(3) Multi-Zone
(4) Individual Room Units
(5) Mixed
(6) Other

The code representing the condition of the system should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Ventilation. A two digit code is used to indicate (1) the type of ventilation system, and (2) the adequacy of the system. The first digit, used to indicate the type of system, should be selected from the following:

(1) Window
(2) Gravity
(3) Mechanical
(4) Integral with Heating or Cooling
(5) Combination
(6) Other

The second digit is used to indicate the adequacy of the system utilizing the following codes:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Interior Partitions. A two digit code is used to indicate (1) the type of interior partitions used, and (2) the condition of the partitions. The first digit is used to indicate the type of interior partitions. A code should be selected from the following:

(1) Fixed
(2) Demountable
(3) Movable
(4) Folding
(5) Accordion
(6) Portable
(7) Other

The second digit code represents the condition of partitions as follows:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Roofing. A two digit code is used to indicate (1) the type of roofing system, and (2) the condition of the roof. The first digit code should be selected from the following:

(1) Tar and Gravel Built-up Roof
(2) Copper Standing Seam
(3) Asbestos Shingle
(4) Slate
(5) Asphalt Shingle
(6) Other

The second digit code indicates the condition and should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Artificial Lighting. A two digit code is used to indicate (1) the type of artificial lighting, and (2) its adequacy. The first digit code should be selected from the following:

(1) Incandescent - Bare
(2) Incandescent - Opulescent Globe
(3) Incandescent - Concentric Ring
(4) Fluorescent - Bare
(5) Fluorescent - Shielded
(6) Combination
(7) Other

The second digit code should be selected from the following adequacy codes:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Electrical System. A two digit code is used to indicate (1) the capacity of the electrical system, and (2) its adequacy for the school. The first digit code indicates capacity and should be selected from the following:

(1) 208/120 Volts
(2) 240/120 Volts
(3) 480/277 Volts
(4) Other

The second digit code indicates adequacy and should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Plumbing System. A two digit code is used to indicate (1) the expansibility of the plumbing system, and (2) the adequacy of the system. The first digit of the code, indicating expansibility of the system, should be selected from the following:

(1) Expansible
(2) Non-Expansible

The second digit code, indicating adequacy, should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Fire Alarm. A two digit code is used to indicate (1) the existence of a separate and distinct fire alarm system, and (2) the condition of the system. The first digit code should be selected from the following:

(1) Self-contained System
(2) Combined with Inter-communication System
(3) Other
(4) None

The second digit code, indicating the condition of the system, should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Automatic Sprinkler. A two digit code is used to indicate (1) the existence of a sprinkler system, and (2) its condition. The first digit of the code should be selected from the following:

(1) Complete Building
(2) Partial Building
(3) None

The second digit of the code should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Emergency Lighting. A two digit code is used to indicate (1) the availability of an emergency electrical system to the building and (2) the energy source for the system. The first digit code should be selected from the following:

(1) Yes
(2) No

The second digit code should be selected from the following:

(1) Gasoline
(2) Diesel
(3) Natural Gas
(4) Battery
(5) Other

Floors. A two digit code is used to indicate (1) the type of material used as finished floors, and (2) the condition of the floors. The first digit code should be selected from the following:

(1) Concrete
(2) Wood
(3) Resilient Tile
(4) Ceramic Tile
(5) Terrazzo
(6) Carpet
(7) Quarry Tile
(8) Other

The second digit code indicating floor condition should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Sanitary System. A two digit code is used to indicate (1) the availability of sanitary facilities (group toilet rooms) within the building, and (2) the general condition of these facilities. The first digit code should be selected from the following:

(1) Both Sexes
(2) Male Only
(3) Female Only
(4) None

The second digit code indicating general condition of the sanitary system should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Building Classification. A two digit code is used to indicate (1) the extent of permanence or mobility of a building, and (2) the general condition of the building. The first digit code, indicating the degree of permanence, should be selected from the following:

(1) Permanent
(2) Temporary
(3) Relocatable

The second digit code should be selected from the following:

(1) Missing
(2) Inadequate
(3) Marginal
(4) Adequate
(5) Superior

Floor Area. A six digit code is used to enter the gross area of the building. The gross area of the building is the sum of the areas within the principal outside faces of exterior walls. All floors with clear standing head room of six feet, six inches should be included. Enclosed passageways of similar and same quality of construction should be included. Unenclosed roof areas and passageways or covered corridors not of similar or same quality should be included at one-half of the measured area.

Number of Teacher Stations. A three digit code is used to indicate the number of teachers that rooms and spaces in the school building will accommodate adequately. A teacher station is an area (room or space) within the school plant that was intended to serve a teacher and a class of pupils either as a single group or as part of a larger group. This entry may be accumulated from the data included on Form C, Space/Room File.

Number of Pupil Stations. A four digit code is used to indicate the number of pupils that rooms and spaces in the school building can accommodate for instructional purposes. The total number is the accumulation of the number of pupil stations in each classroom, laboratory or other space used for instructional purposes. This entry may be accumulated from the data included on Form C, Space/Room File.

Space/Room Data: Codes and Definitions

Form C is the space record designed to receive data about rooms and spaces within each building. Form C must be completed for each separate building addition on each parcel. One line is allocated for each room or space in each building or building addition.

Card Code. A two digit code is used to indicate the number of cards used for each building or building addition.

District Number. District code should be entered. Entry is the same as for Form B.

Site Number. Digit spaces are provided for site code number.

Organizational Unit. Appropriate code should be entered.

Building Number. Unique building code number should be used.

Addition Number. Entry is the same as for Form B.

Space Number. A unique number is used to identify each separate instructional and service room or space in each building and building addition. Existing room numbers may be used if appropriate. Otherwise, a unique number is assigned to each separate instructional and service room or space. A three digit code is provided for this purpose.

Space Adjunct. A space adjunct is one that either joins of is connected to a major instructional or service space. If an adjunct

FORM C

SPACE/ROOM FILE

REF: EFPC 003

SCHOOL NAME

1 CARD CODE	2 DISTRICT NUMBER	3 SITE NUMBER	4 ORGANIZATIONAL UNIT	5 BUILDING NUMBER	6 ADDITION NUMBER
1 2	3 5	6 8	9 12	13 14	15

7 SPACE NO.	8 SPACE ADJ.	9 AREA SQ. FT.	10 DESIGN USE	11 WALLS	12 FLOORS	13 CEILING	14 ARTIF. LIGHTING	15 NATURAL CONTROLS	16 HEAT SYS.	17 COOL SYS.	18 VENT.	19 WINDOWS	20 CHKBD	21 TKBD	22 PUPIL STAS.	23 TEACH STAS.	24 ROOM CLASS	25 COND CODE	26 LOC CODE
16-18	19	20-24	25-27	28	29	30	31	32	33	34	35	36	37	38	39-41	42	43	44	45

space serves more than one instructional or service space, a decision must be made to assign it to only one major space. A code should be selected from one of the following:

(1)	Work Room	(6)	Dressing Room
(2)	Office	(7)	Toilet Room
(3)	Storage Room	(8)	Cloak Room
(4)	Conference Room	(9)	Vault
(5)	Observation Room	(10)	Other

A separate line is used for each adjunct space.

Area Square Feet. A five digit code is used to indicate the measured number of square feet of floor space included in the teaching space, service room or adjunct space. If instructional unit or teaching station is part of a large open space, the square footage should be prorated among teaching stations. Measurements should be taken from inside of enclosing walls, whether space is large open area or a separate and distinct enclosed room.

Design Use. A code number is assigned to describe the function for which a particular room or space was designed. A room or space may be used for some function other than for which it was designed; if so, design use rather than actual use is indicated. Original design use may have been modified to permit a change of use; if so, indicate code for new use.

A three digit code is used to indicate design use. The first digit is selected from the following:

(1)	Regular Classroom	(5)	Laboratory
(2)	Seminar Room	(6)	Shop
(3)	Large Group Space	(7)	Other
(4)	Teaching Station - Open Space		

The last two digits of the three digit code are used to identify the type of space. A code should be selected from the following:

Instructional Space

(01) Agriculture
(02) Art
(03) Biological Science
(04) Business
(05) Chemistry
(06) Construction
(07) Distributive Occupations
(08) Drafting and Design
(09) Drama
(10) Driver Education
(11) Electronics
(12) English Language Arts
(13) Foreign Language
(14) Graphic Arts
(15) Health Occupations
(16) Health
(17) Home Economics
(18) Industrial Arts
(19) Interchangeable Space
(20) Journalism
(21) Library/Media Center
(22) Mathematics
(23) Music
(24) Office Occupations
(25) Physical Education
(26) Physical Sciences
(27) Reading
(28) Safety Education
(29) Social Studies
(30) Special Education
(31) Technical Education
(32) Textiles
(33) Trades and Industries
(34) Transportation
(35) Welding
(36) Little Theatre/Auditorium
(37) Other Instructional Space

Service Space

(40) Storage
(41) Food Service
(42) Custodial
(43) Maintenance
(44) Health Services
(45) Guidance Services
(46) Toilet Rooms
(47) Teachers' Room
(48) Other Service Area

Administrative Space

(50) Office
(51) Waiting Area
(52) File Room
(53) Work Room
(54) Records Room
(55) Conference Room
(56) Other Administrative Space

Circulation Space

(60) Inside Corridor
(61) Outside Corridor - Enclosed
(62) Covered Walkway
(63) Lobby
(64) Inside Stairway
(65) Outside Stairway
(66) Entranceway
(67) Other Circulation Space

Walls. A single digit code is assigned to indicate the wall finish materials used in rooms and spaces. A code should be selected from the following:

(1) Plaster
(2) Concrete Block
(3) Brick
(4) Wood
(5) Metal
(6) Gypsum Board
(7) Epoxy Finish
(8) Ceramic Tile
(9) Other

Floors. A single digit code is used to indicate the type of material used as finished floors. A code should be selected from the following:

(1) Concrete
(2) Wood
(3) Resilient Tile
(4) Ceramic Tile
(5) Terrazzo
(6) Carpet
(7) Quarry Tile
(8) Other

Ceiling. A single digit code is used to indicate the type of material used in the finished ceiling. A code should be selected from the following:

(1) Plaster
(2) Acoustical Plaster
(3) Acoustical Tile
(4) Wood
(5) Metal
(6) Fiber Board
(7) Gypsum Board
(8) Open
(9) Other

Artificial Lighting. A single digit code is used to indicate the type of artificial lighting installed in rooms and spaces. A code should be selected from the following:

(1) Incandescent
(2) Fluorescent
(3) Cold Cathode
(4) Mercury
(5) Other

Natural Lighting Controls. A single digit code is used to indicate the type of daylight controls installed in rooms and spaces. A code should be selected from the following:

(1) Venetian Blinds
(2) Double-roll Shades
(3) Single-roll Shades
(4) Drapes
(5) Sun Screens
(6) Louvers
(7) Low Transmission Glass
(8) Baffles
(9) Other

Heat Distribution. This code refers to the type hardware used in the heated space to distribute heat. A single digit code is used. A selection should be made from the following:

(1) Duct System
(2) Unit Ventilators
(3) Convectors - Gravity
(4) Convectors - Fan Forced
(5) Radiators
(6) Fin Tube Radiation
(7) Radiant Panel
(8) Other
(9) None

Cooling System. This code is used to indicate the means of delivering the cooling medium to the room or space. A single digit code is used and should be selected from the following:

(1) Duct System
(2) Unit Ventilator
(3) Fan-Coil Unit
(4) Window Unit
(5) Other
(6) None

Ventilation. A single digit code is used to indicate the means of ventilation in rooms and spaces. A code should be selected from the following:

(1) Window
(2) Gravity
(3) Mechanical
(4) Integral with Heating or Cooling
(5) Combination
(6) Other

Windows. A single digit code is used to indicate the type of windows installed in rooms and spaces. A code should be selected from the following:

(1) Single Hung
(2) Double Hung
(3) Projected
(4) Casement
(5) Fixed
(6) Other
(7) None

Chalkboard. A single digit code is used to indicate the type of chalkboard installed in rooms and spaces. A code should be selected from the following:

(1) Fixed
(2) Relocatable
(3) Portable
(4) None

Tackboard. A single digit code is used to indicate the type of tackboard installed in rooms and spaces. A code should be selected from the following:

(1) Fixed
(2) Relocatable
(3) Portable
(4) None

Pupil Stations. Three digits are used to indicate the number of pupil stations in each room and space in a building or addition. The number of pupil stations shown should be based on some standard formula or other basis for determination.

Teacher Stations. Generally, one instructional room or space will house one teacher station. Some rooms and spaces will house no teacher stations. A single digit code is provided to indicate the appropriate number.

Room Classification. A single digit code is used to indicate the degree of permanence of the use of a room or space. A code should be selected from the following:

(1) Permanent
(2) Temporary
(3) Makeshift
(4) Relocatable

Condition. A single digit code is used to indicate the adequacy of the condition of the room or space. Condition of all features within the room or space should be considered. The selection of a code is a matter of judgment after weighing the individual features. A code should be selected from the following:

(1) Missing - Desirable features do not exist in any condition
(2) Inadequate - Clearly below established standards or criteria
(3) Marginal - Below established standards or criteria, but allow operation below level of desirable effectiveness
(4) Adequate - Meets established standards or criteria
(5) Superior - Clearly above established standards or criteria

Location Code. A single digit code is used to indicate the location of a room or space by floor level in the building. A code should be selected from the following:

(0) Sub-Basement
(1) Basement
(2) First Floor
(3) Second Floor
(4) Third Floor
(5) Fourth Floor
(6) Fifth Floor
(7) Sixth Floor
(8) Seventh Floor
(9) Eighth or Above

Enrollment Data: Codes and Definitions

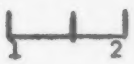
Form D is the enrollment record designed to receive data about the pupil enrollment for an organizational unit. Enrollment as used in the GONA Model is the count of pupils on the active roll of the school. It is the number of pupils for which the school has been assigned to provide educational services.

Card Code. A two digit code is provided which allows expanding the number of cards to as many as 99 for each organizational unit. One card may be used for each year of enrollment data. Card 01 may be used for

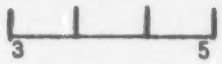
FORM D

REF: EFPC 004 ENROLLMENT FILE

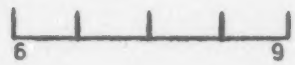
1. CARD CODE



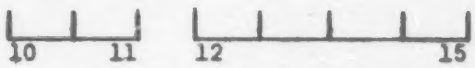
2. DISTRICT NUMBER



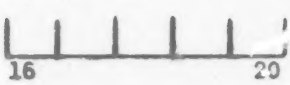
3. ORGANIZATIONAL UNIT



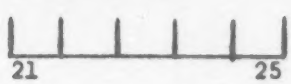
4. ACTIVE ENROLLMENT: MONTH YEAR



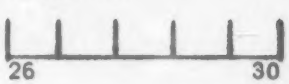
PREPRIMARY



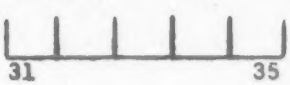
KINDERGARTEN



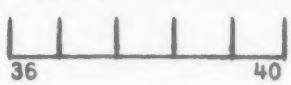
GRADE 1



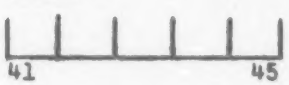
GRADE 2



GRADE 3

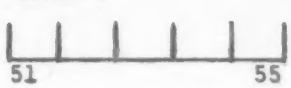


GRADE 4

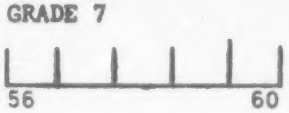


GRADE 5

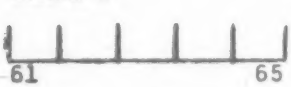
GRADE 6



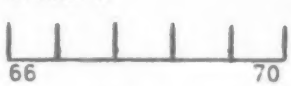
GRADE 7



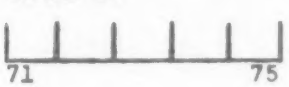
GRADE 8



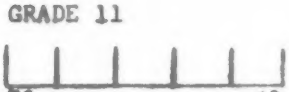
GRADE 9



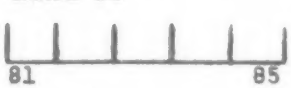
GRADE 10



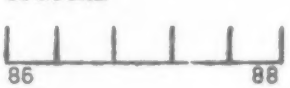
GRADE 11



GRADE 12



SPECIAL



enrollment data for the current year. Card 02 may be used for enrollment data for last year and so on. A separate card may be used for each separate month if this is more desirable.

District Number. A three digit code is used to indicate the unique number assigned to the school district.

Organizational Unit. A four digit code used to indicate the unique number assigned to the organizational unit.

Active Enrollment. Seventy-nine digits are used to indicate the active enrollment for each grade in the school and for a particular school month and year.

Month. A two digit code is used to indicate the month in which the active enrollment data were taken. If data are for an entire year, then the "month" code would be 00. If enrollment data were for January, the "month" code would be 01; for December, 12 and so on.

Year. A four digit code is used to indicate the year of the enrollment data. An entry is made to correspond to each of the four digits of the appropriate year; for example, 1 9 7 3.

Pre-Primary. A five digit code is used to indicate the number of children on the active roll who are in programs that are below kindergarten level in the school. Zeros are entered if there is no enrollment.

Kindergarten. A five digit code is used to indicate the number of children who are enrolled in the kindergarten

program of the school. Zeros make up the code number if no children are enrolled.

Grade 1 through Grade 12. A series of five digit codes are used to indicate the number of children on active roll in each grade from one through 12 housed in the school. Actual numbers are used as the entries preceded by zeroes if the number of digits used do not fill the digit places provided. Examples are: Grade 1 - 00000; Grade 10 - 0 1 6 5 4, and so on.

Special. Five digits are provided to indicate the number of pupils enrolled in programs that require the maintenance of separate rolls and which may have some special classification either for fiscal or other reasons.

SUMMARY

A data sub-system which supports the GONA Model has been described. Data items, essential to the effective use of the model have been described, and codes have been suggested. Data files have been presented also that provide for the orderly collection and recording of the needed data.

The four components of the data sub-system are:

1. The site data file which is used to record and store relevant site data.
2. The building data file which is used to record and store relevant building data.

3. The space/room data file which is used to record and store relevant room and space data.
4. The enrollment data file which is used to record and store relevant enrollment data by grade and by organizational unit.

V

OUTPUTS OF THE GONA MODEL

Outputs of the GONA Model are the results of the processing and synthesizing of data gathered for the purpose of determining facilities needs and establishing goals, objectives and strategies for fulfilling those needs. The purpose of this section is to describe and illustrate data outputs that facilitate the use of the GONA Model in accomplishing its stated purposes.

Selected Outputs: Descriptions and Illustrations

The organization, analysis and interpretation of the data outlined in Chapter IV may be accomplished in a variety of ways. A number of output formats have been developed and used with the GONA Model. These are presented and described in the following pages.

Site Data: Output Formats

A printout of all site data should be made to provide a means of final verification and a ready reference file. Furthermore, decisions can be facilitated with regard to the further processing of data to provide information to help resolve specific kinds of problems.

Output Form 1 is a table shell designed to display a tabulation of ratings on school site characteristics. An examination of Form 1 will reveal that the data are intended to show the adequacy of the various

features of the sites used by the school district. Objectives for corrective action can be established by referring to the marginal, inadequate and missing categories.

OUTPUT FORM 1

Summary of Ratings
School Site Characteristics

(1) Site Features	Number and Percentage of Ratings										(12) Total No.
	Superior		Adequate		Marginal		Inadequate		Missing		
	(2) No.	(3) %age	(4) No.	(5) %age	(6) No.	(7) %age	(8) No.	(9) %age	(10) No.	(11) %age	
Playground											
Landscaping											
Drainage											
Parking											
Safety											
Terrain											
Environment											
Location											
Access											
Bus Loading											
Electrical Service											
Traffic Control											
Athletic Fields											
Exterior Lighting											

Output Form 2 is a table shell designed to display data on the adequacy of the size of school sites. The cells provide for entries of enrollment capacity of the plant used by each organizational unit. Site acreage for each school is shown together with acreage available for school use in parks or recreation areas. Recommended acreages are entered as guidelines to an assessment of adequacy. Pre-determined criteria are applied as a basis for the entries dealing with the assessment of adequacy shown in cells 8-10.

OUTPUT FORM 2

Adequacy of School Site Size

(1) Organizational Unit	(2) Enrollment Capacity	Acreage			Recommended Acreage		Adequacy			
		(3) Site	(4) Park	(5) Total	(6) State	(7) CEFP	(8) Superior	(9) Adequate	(10) Marginal	(11) Inadequate
Totals										

Building Data: Output Formats

A printout of all building data is likewise important. The data printout will provide the means of final verification of data completeness and accuracy, as well as provide a ready reference file for other uses.

Output Form 3 was designed to display data on the number of buildings by date of construction and the number of pupil stations contained in those buildings. Age of buildings usually correlates with both obsolescence and condition. Consequently, Form 3 provides data that are an indication of the general condition of buildings in the school district. There are exceptions to this generalization, of course. The exceptions can be ferreted out from an analysis of the printout data.

Output Form 4 provides for the tabulation of a summary of the ratings given to each component of each building in the school district. By reference to Columns 6-11, the need for improvement in selected building

OUTPUT FORM 3

Distribution of the Number and Capacity of Buildings by Date of Construction

(1) Date of Construction	(2) Number of Buildings	Estimated Number of Pupil Stations	
		(3) Number	(4) Percentage
Prior to 1850			
1850 - 1874			
1875 - 1899			
1900 - 1919			
1920 - 1929			
1930 - 1939			
1940 - 1949			
1950 - 1959			
1960 - 1969			
1970 -			
Totals			

features can be identified. Statements of objectives may be readily formulated to eliminate the deficiencies. For a more detailed analysis on an organizational unit and individual building basis, the printout referred to earlier and the individual rating scales may be used.

Output Form 5 was designed to provide a summary of the estimate of the condition of all educational buildings in the district. Objectives can be formulated from an examination of this table to project the need for improvement of particular types of buildings.

Output Form 6 was designed to provide a compilation of the number of buildings and amount of space by organizational unit according to the permanence classification. The data provide an indication of the extent to which building space in the district is permanent or temporary. An outcome of this analysis would be to either reduce the number of relocatables or increase the amount of permanent space.

OUTPUT FORM 4

Summary of Ratings
Characteristics of Educational Buildings

(1) Building Feature	Superior		Adequate		Marginal		Inadequate		Missing		(12) Total
	(2) No.	(3) %age	(4) No.	(5) %age	(6) No.	(7) %age	(8) No.	(9) %age	(10) No.	(11) %age	No.
Structure											
Exterior Wall											
Fenestration											
Heat Type											
Heat Distribution											
Cooling Type											
Ventilation											
Interior Partition											
Roofing											
Artificial Lighting											
Electrical Service											
Plumbing											
Fire Alarm											
Auto. Sprinkler											
Emergency Lighting											
Floors											
Sanitary System											

OUTPUT FORM 5

Summary of Building Evaluations
Estimate of Condition

(1) Type	Superior		Adequate		Marginal		Inadequate		(10) Total
	(2) No.	(3) %age	(4) No.	(5) %age	(6) No.	(7) %age	(8) No.	(9) %age	
Elementary									
Middle Schools									
High Schools									
Totals									

OUTPUT FORM 6

Number of Buildings and Amount of Space by
Organizational Unit According to
Permanence Classification

(1) Organizational Unit	Number of Buildings and Amount of Space by Category						(8) Total No.
	Permanent		Temporary		Relocatable		
	(2) Buildings	(3) Space	(4) Buildings	(5) Space	(6) Buildings	(7) Space	
Totals							

A summary of floor area, number of teacher stations and pupil stations by building classification is indicated in Output Form 7. The extent to which both teacher and pupil stations are located in temporary or relocatable facilities is also shown.

OUTPUT FORM 7

Summary of Floor Area, Teacher Stations and
Pupil Stations by Building Classification

(1) Building Classification	Floor Area		Teacher Sta.		Pupil Sta.		(8) Number of Buildings
	(2) Amount	(3) %age	(4) Number	(5) %age	(6) Number	(7) %age	
Permanent Temporary Relocatable							
Totals							

An analysis of existing space is usually needed to determine what area within a school building has been airconditioned. Output Form 8 was designed to show the extent to which existing buildings occupied by organizational units have climate control facilities. The data entered on this form provide the information required to assess the need for additional climate control facilities.

OUTPUT FORM 8

Extent of Climate Control in Educational Buildings by Organizational Unit

(1) Buildings by Organizational Unit	(2) Type of Cooling System	Area Cooled			(6) Total Area	(7) %age Area Cooled
		(3) None	(4) Partial	(5) All		
Totals						

Space/Room Data:
Output Formats

A printout of all space and room data should be provided. The accuracy of the data and its completeness can be determined more readily through the careful examination and spot checking of the printout. A ready reference file on room and space data is an invaluable asset as a management tool.

Output Form 9 was designed to display summary data on the ratings of instructional spaces. The number and percentage of ratings are

OUTPUT FORM 9

Summary of Ratings of Instructional Space Characteristics, Number and Percentage of Rooms Classified According to Adequacy of Major Feature

(1) Major Feature	Superior		Adequate		Marginal		Inadeq.		Missing		(12) Total Number
	(2) No.	(3) %age	(4) No.	(5) %age	(6) No.	(7) %age	(8) No.	(9) %age	(10) No.	(11) %age	
Wall Finish											
Floor Finish											
Ceiling											
Artificial Lighting											
Natural Light Controls											
Heating System											
Cooling System											
Ventilation											
Windows											
Chalkboard											
Tackboard											

compiled by major room feature. Objectives for improvement in room and space conditions may be prepared from an analysis of the data compiled in Output Form 9.

The number and percentage of classrooms, laboratories and other type rooms and spaces are compiled according to room classification in Output Form 10, Data are compiled to provide information to determine what corrective action is needed to improve the adequacy of instructional rooms and spaces.

Output Form 11 is a table shell designed to display data about the adequacy of library seating capacity. The data are compiled by organizational unit. Cell number 2 provides for data on the enrollment capacity of the school plant serving each organizational unit. Floor area of each

OUTPUT FORM 10

Number and Percentage of Classrooms, Laboratories and Other Instructional Rooms by Room Classification

(1) Design Use	Room Classification								(10) Total Number
	Permanent		Temporary		Makeshift		Relocatable		
	(2) No.	(3) %age	(4) No.	(5) %age	(6) No.	(7) %age	(8) No.	(9) %age	
Regular Classroom									
Seminar Room									
Large Group Space									
Teaching Station									
Open Space Laboratory									
Shop									
Other									
Totals									

OUTPUT FORM 11

Adequacy of Library Seating Capacity

(1) Organizational Unit	(2) Plant Enrollment Capacity	Size of Library		(5) Required Capacity	Adequacy Rating			
		(3) Floor Area	(4) Seating Capacity		(6) Superior	(7) Adequate	(8) Marginal	(9) Inadequate
Totals								

library is shown in Cell 3, and design capacity of the library in Cell 4, Cell 5 was to display data on the capacity of the library as determined by a previously made choice of a standard or criterion. The adequacy rating, selected from the adequacy rating scale, was to be indicated in a cell chosen from Cells 6-8. The data displayed in this form should provide a basis for determining the need to improve library facilities.

Output Form 12 is a table shell similar to Output Form 11 except that it was designed to display data on the adequacy of dining room facilities. The enrollment capacities of plants belonging to organizational units are the same in both table shells. A predetermined set of standards or criteria is used as the guidelines for assigning an adequacy rating. These data should be adequate to provide an assessment of the adequacy of lunchroom seating capacities.

OUTPUT FORM 12

Adequacy of Lunchroom Seating Capacity

(1) Organizational Unit	(2) Plant Enrollment Capacity	Size of Dining Room		(5) Required Capacity	Adequacy Rating			
		(3) Floor Area	(4) Seating Capacity		(6) Superior	(7) Adequate	(8) Marginal	(9) Inadequate
Totals								

Enrollment Data:
Output Formats

A printout of enrollment data by grade and organizational unit is also desirable. Enrollment data displayed in relation to pupil capacities of permanent buildings provide the means for a simple discrepancy analysis to determine housing needs of pupils who are in crowded facilities or otherwise improperly housed.

Output Form 13 was designed to display current active school enrollment by organizational unit in relation to permanent pupil enrollment capacity of existing school plants. Cells 4 and 5 were used to display the algebraic differences between current active enrollment and permanent pupil capacities of plants used by organizational units. The entry displayed in Cell 4 is the difference between enrollment and capacity when the capacity is greater than the enrollment. The entry made in Cell 5 is the difference between enrollment and capacity when the enrollment exceeds capacity.

OUTPUT FORM 13

Extent of Crowding of Facilities

(1) Organizational Unit	(2) Current Enrollment	(3) Enrollment Capacity	(4) Excess Capacity	(5) Excess Enrollment
Totals				

Output Form 14 was designed to display data to indicate the number of unhoused pupils by grade group. Enrollments are assigned to organizational units according to the appropriateness of the design of facilities for programs and pupils at the grade levels indicated. If enrollment exceeds capacities, data are displayed in the appropriate cell selected from Cells 4-9.

OUTPUT FORM 14

Unhoused Pupils by Grade Level According to Estimated Plant Capacity and Current Enrollment

(1) Organizational Unit	Enrollment vs. Permanent Capacity		Unhoused Pupils by Grade Groups					
	(2) Enrollment	(3) Capacity	(4) K	(5) 1-5	(6) 6-8	(7) 9-12	(8) Special	(9) Total
Totals								

Summary

A selected set of output forms have been presented in this section of the Monograph. The provisions made for displaying data in the forms presented herein provide the basis for a discrepancy analysis to determine school housing needs.

Site data output forms for assessing the need for improving existing site features and for site expansion were presented and discussed. Objectives for improving existing site conditions may be formulated from the data displayed in these forms.

Building data output forms were presented to display pertinent data for the purpose of assessing discrepancies in general building conditions and in specific building features. The data displays provide the means for the preparation of objectives and strategies for improving building conditions.

Space/room output forms were presented to display discrepancies and needs for improving instructional spaces. The data displays provide the means for preparing objectives to accomplish improvement in these spaces.

Enrollment output forms were presented to display the relationships between enrollment at each organizational unit and the permanent capacity of school plants used by these units. The purpose of these displays were to determine the need for housing required to relieve crowded situations and to provide appropriate housing for pupils housed in temporary facilities. Objectives for relieving crowded conditions and replacing temporary facilities may be formulated from these data.

VI

SUMMARY AND CONCLUSIONS

This monograph has described the conceptual framework for a facilities planning/management system. The system is called FRAMES - an acronym for Facilities Resource Allocation Management Evaluation System. The principal focus of the system is the allocation and management of resources provided for the planning, construction and use of educational facilities.

To be effective, a facilities planning/management system must fulfill the following requirements:

1. The system must be responsive to the educational program which it serves.
2. The system must provide the means for the accountability of its effectiveness.
3. The system must provide for the consideration of alternatives in the resolution of conflicting choices.
4. The system must be capable of responding to unexpected and uncontrollable circumstances
5. The system must anticipate alternative futures and be responsive to them.
6. The system must reflect the consequences of the interrelationships and interdependencies that relate it to the larger system of which it is a part.

7. The system must place planning and decision-making at the level in the organizational structure where the most relevant and effective decisions can be made.
8. The system must be conceptual in design but practical in its implementation.

The FRAME System

The processes of the FRAME System are derived from the concept that the educational facilities of a school district form a system. The facilities of the school district are likewise a part of a larger system - the school district. Similarly, the facilities used by a school form a sub-system.

Six postulates were presented which give direction to the development and use of the facilities system. These are:

1. The school system has a purpose for its existence, and educational facilities should respond positively and contribute effectively to the accomplishment of that purpose.
2. More effective decisions regarding the planning of educational facilities can be made and greater benefits can accrue from their development when facilities programs are considered on a long-term basis.
3. Better decisions regarding the development of facilities to fulfill goals and objectives result when the physical requirements for instructional and

supporting services are deliberately programmed for development.

4. The demand for resources to develop the most effective school plant is always greater than those available for that purpose.
5. The timely delivery of an adequate educational facilities project is the consequence of a totally integrated facilities planning, design and management process.
6. The effectiveness of the facilities program is the result of the direct functioning of the planning/management system.

The major processes of the FRAME System are: (1) Needs assessment, (2) facilities programming, (3) resource allocation and distribution, (4) facilities management, and (5) evaluation. Needs assessment is the process of determining the discrepancies that exist between existing facilities and the best estimate of what facilities are required to fulfill the school district's mission. Facilities programming is the process of determining the facilities required for the support of a particular set of learning objectives, instructional activities and supporting services which are usually associated with a particular school. The resource allocation and distribution process involves estimating capital costs, assessing the availability of resources to meet needs, the allocation of resources to programs and projects, the development of a funding plan and the accounting and auditing of expended resources. Facilities management is the process of organizing, controlling, decision-making, communicating, directing, and coordinating the educational facilities of a school district. Evaluation is the

process of assessing the extent to which the facilities program fulfills predetermined goals and objectives.

GONA: A Needs Assessment Model

The first stage in the FRAME System is the assessment of facilities needs. A needs assessment model was presented as a framework for accommodating the process, task and data variables involved in planning for the development of educational facilities. The purpose of the model is to provide a systematic approach to determining facilities needs and preparing goals, objectives and strategies for fulfilling those needs.

The GONA Model consists of five major components and three supporting sub-systems. The five major components are:

1. Community Aspects
2. Pupil Population
3. Educational Program
4. Existing Facilities
5. Fiscal Aspects

The supporting sub-systems include:

1. The planning process sub-system
2. The facilities data sub-system
3. The planning criteria

The major components and supporting sub-systems were discussed in light of their use and application in the GONA Model.

The Facilities Data Sub-System

The data system designed to support the GONA Model is composed of four components:

1. Site Data File - used to record and store relevant site data.
2. Building Data File - used to record and store relevant building data.
3. Space/Room Data File - used to record and store relevant room and space data.
4. Enrollment Data File - used to record and store relevant enrollment data by grade and by organizational unit.

A site file, a building file, a space/room file and an enrollment file have been developed to record data for use in the facilities data sub-system. Codes and definitions for recording relevant data in these files were presented and discussed.

Outputs of the GONA Model

Outputs of the GONA Model are the results of the processing and synthesizing of data used in determining facilities needs and in establishing goals, objectives and strategies for meeting those needs. Data output formats were developed and presented as the means of facilitating the use of the facilities needs assessment model (GONA).

An important output is the printout of data available in each of the four data files; the site data, building data, space/room data, and enrollment data. Printouts of these data provide a means of verification and spot-checking of completeness and accuracy of the data files. Furthermore, such printouts provide a ready reference file for planning and decision-making purposes.

Two output forms were presented to display site data. Output Form 1 provided for the display of the ratings on school site characteristics. Output Form 2 was designed to display data on the adequacy of the size of school sites. An examination of the cells of these formats were intended to reveal the discrepancies between what is availalbe and what is desired; thereby, indicating the need for improvement in school sites.

Six output forms were developed and described to display building data. Output Form 3 was used to display data on the number of buildings according to date of construction. Output Form 4 was used to provide a tabulation which summarizes the ratings given to the components of each building. Output Form 5 was designed to summarize the ratings of the condition of the building. The permanent and temporary characteristics of building space were proposed for display in Output Form 6. Provision was made to display the amount of floor area, the number of teacher and pupil stations according to permanence classification in Output Form 7. Output Form 8 was designed to provide an analysis of the extent of climate control in buildings belonging to each organizational unit.

Four output forms were developed to display space/room data. Output Form 9 was developed to display data on the ratings of instructional spaces. A summary of the ratings of space characteristics was

developed for display in Output Form 10. Provision was made to display data relative to the adequacy of library seating capacity in Output Form 11. Output Form 12 was designed to display data dealing with the adequacy of lunchroom seating capacity.

Two enrollment output forms were developed to display enrollment data. Output Form 13 was developed to display the relationship between active enrollment and school plant capacity by organizational unit. The number of unhoused pupils by grade groups was to be displayed in Output Form 14.

Conclusion

For sometime a need has existed for the development and use of a more systematic approach to the planning and management of educational facilities. This monograph has attempted to provide a conceptual basis for such a system and, at the same time, describe a very carefully developed and tested needs assessment model.

SELECTED REFERENCES

Banghart, Frank W. Educational Systems Analysis. London: The McMillan Company, 1969.

Barr, W. Monfort and K. Forbis Jordan. "Financing Public Elementary and Secondary Facilities," in Planning to Finance Education. Johns-Alexander-Jordan, editors. Gainesville, Florida: National Educatio Finance Project, 1971.

Brass, Irwin D. J. Design for Decision. New York: The Free Press, 1953.

Curtis, William H. Educational Resources Management System. Chicago: Research Corporation of the Association of School Business Officials, 1971.

Florida State Department of Education. Florida Inventory of Schoolhouses. Tallahassee, Florida: The Department, no date.

Kaufman, Roger A. Educational System Planning. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.

McGuffey, C. W., et al. Educational Facilities Survey, Atlanta Public Schools, Atlanta, Georgia: Atlanta Public Schools, Unpublished, 1972.

Mitchell, James E. Documentation. Des Moines, Iowa: Midwestern States Educational Information Project, Revised 1969.

Reason, Paul L. and George G. Tankard, Jr. Property Accounting for Local and State School Systems. Handbook III, No. 22, Washington, D.C.: United States Printing Office, 1959.

Sumption, Merle R. and Jack L. Landes. Planning Functional School Buildings. New York: Harper and Brothers, 1957.

APPENDIX A

FIGURE 3.1

POPULATION TRENDS 1950-1970

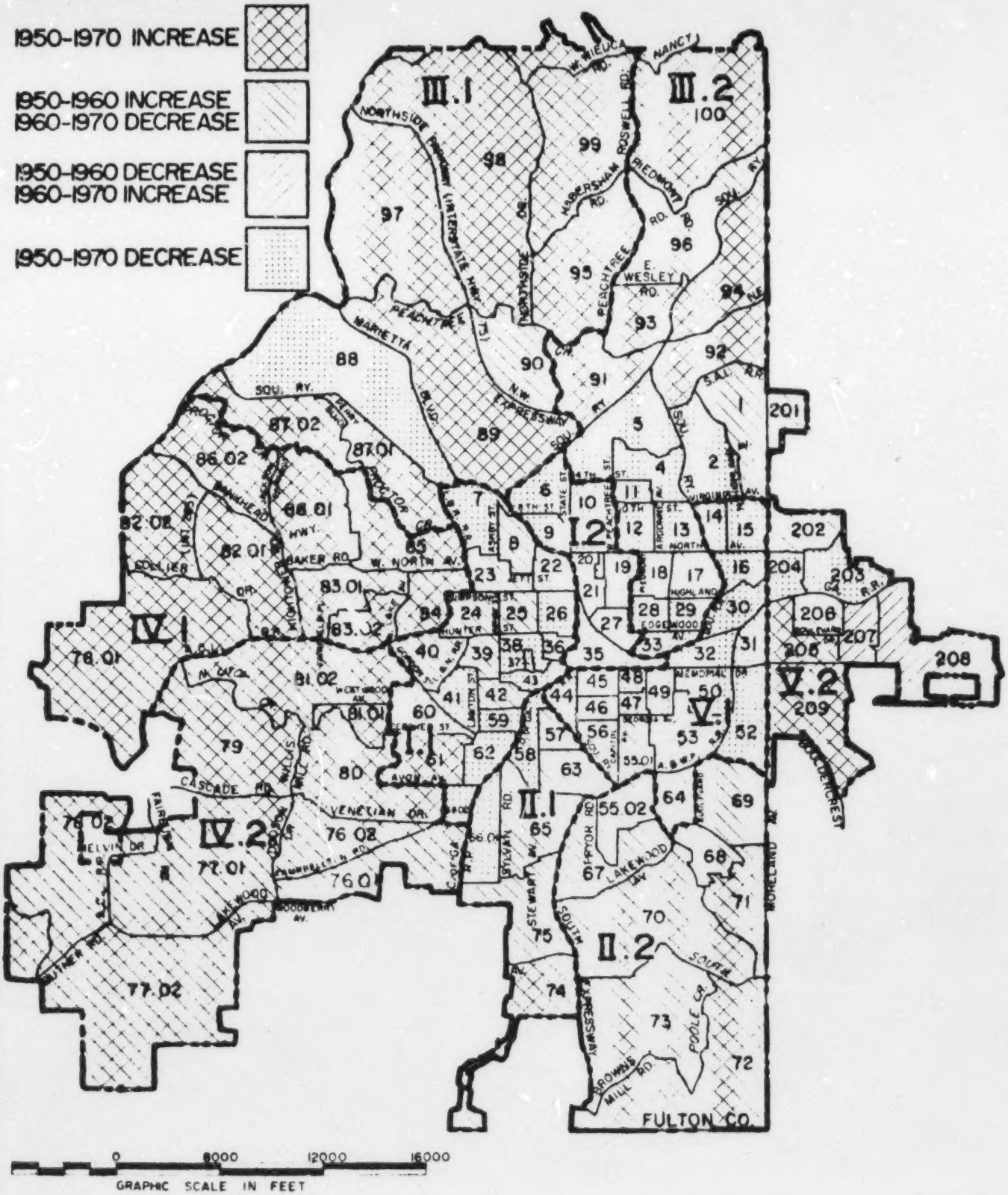
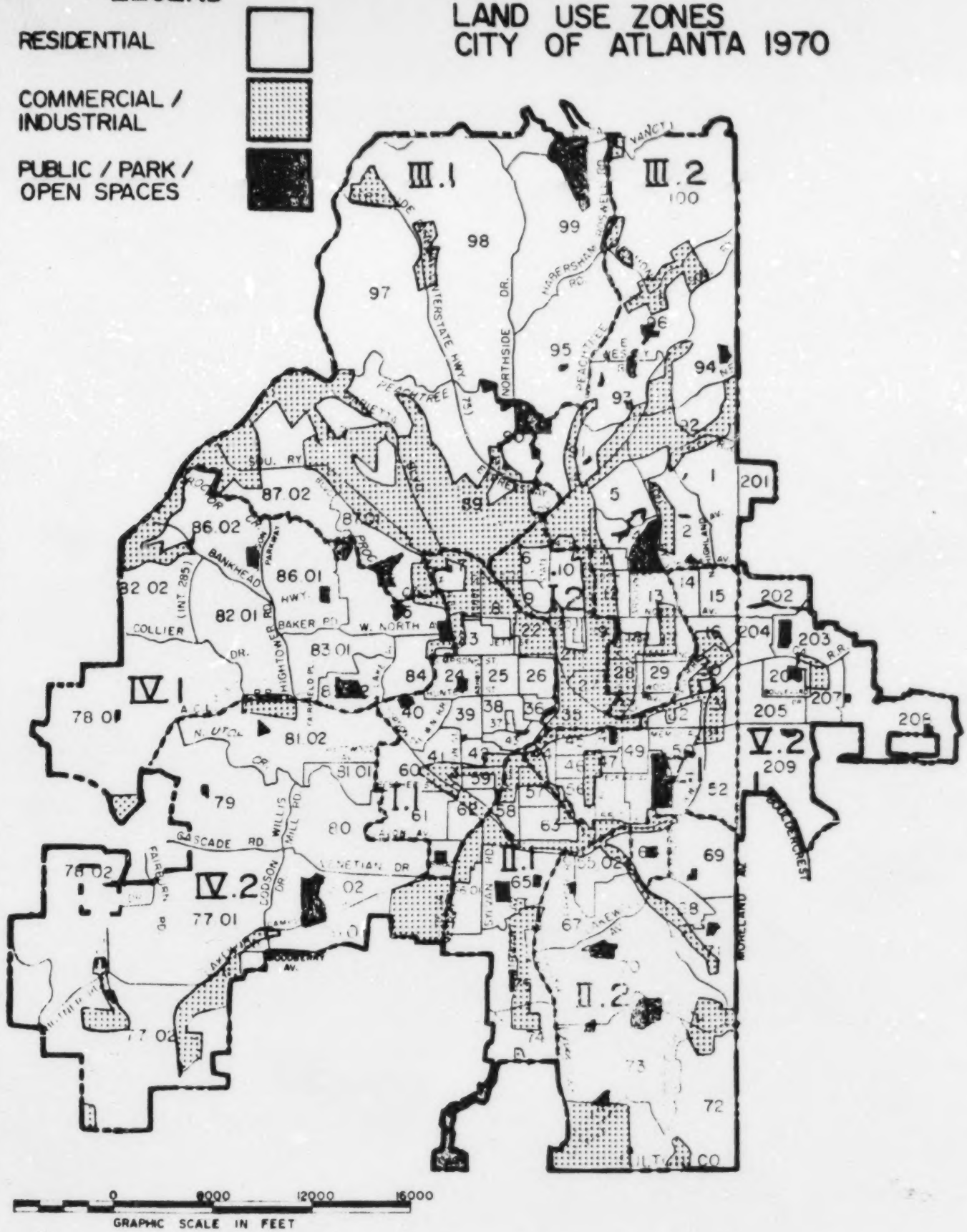


FIGURE 3.2

LAND USE ZONES CITY OF ATLANTA 1970



APPENDIX B

Current Active Enrollment By Grades and By Schools

Name of System _____ Date _____

Name of School	Elementary Grades							Middle Grades				High School Grades					GRAND TOTAL
		1	2	3	4	5	Total	6	7	8	Total	9	10	11	12	Total	

B.1

Summary of Current Active Enrollment
For All Schools

School Year	Grades												Total
	1	2	3	4	5	6	7	8	9	10	11	12	

APPENDIX C

SITE APPRAISAL
EDUCATIONAL FACILITIES PLANNING CENTER
UNIVERSITY OF GEORGIA

SCHOOL: _____ PAGE: _____

ADDRESS: _____ DATE: _____

COMMENTS	COMPONENT	RATING SCALE
	LOCATION	1 2 3 4 5
	DRAINAGE	1 2 3 4 5
	ENVIRONMENT	1 2 3 4 5
	SAFETY	1 2 3 4 5
	SIZE	1 2 3 4 5
	TERRAIN	1 2 3 4 5
	DRIVES	1 2 3 4 5
	PARKING	1 2 3 4 5
	LANDSCAPING	1 2 3 4 5
	PLAYGROUND	1 2 3 4 5
	BUS LOADING	1 2 3 4 5
	ATHLETIC FIELDS	1 2 3 4 5
	UTILITIES	1 2 3 4 5
	TRAFFIC CONTROL	1 2 3 4 5
	ACCESS	1 2 3 4 5

CODE: 1 MISSING 3 MARGINAL 5 SUPERIOR
2 INADEQUATE 4 ADEQUATE

C.2

BUILDING APPRAISAL FORM
EDUCATIONAL FACILITIES PLANNING CENTER
UNIVERSITY OF GEORGIA

PAGE: ____

ORGANIZATIONAL UNIT: _____

BUILDING NO: _____ SITE NO: _____
ADDITION NO: _____ PARCEL NO: _____
DATE CONSTRUCTED: _____ PLAN TYPE: _____
FLOOR AREA: _____ NO. STORIES: _____
TEACHER STATIONS: _____ PUPIL STATIONS: _____
DESIGN USE: _____ BLDG. CLASS: _____

COMMENTS	CODE	COMPONENT	ADEQUACY RATIN
		STRUCTURE	1 2 3 4 5
		EXTERIOR WALLS	1 2 3 4 5
		ROOFING	1 2 3 4 5
		HEATING: TYPE	1 2 3 4 5
		DISTRIBUTION:	1 2 3 4 5
		COOLING TYPE	1 2 3 4 5
		VENTILATION	1 2 3 4 5
		FENESTRATION	1 2 3 4 5
		ELECTRICAL SYSTEM	1 2 3 4 5
		PLUMBING	1 2 3 4 5
		SANITARY SYSTEM	1 2 3 4 5
		ARTIFICIAL LIGHTING	1 2 3 4 5
		EMERGENCY LIGHTING	1 2 3 4 5
		AUTOMATIC SPRINKLERS	1 2 3 4 5
		FIRE ALARM	1 2 3 4 5
		INTERIOR PARTITIONS	1 2 3 4 5
		FLOORS	1 2 3 4 5

SPACE/ROOM APPRAISAL FORM
EDUCATIONAL FACILITIES PLANNING CENTER
UNIVERSITY OF GEORGIA

PAGE: _____

SCHOOL: _____ BUILDING: _____ ADD. NO: _____ SITE: _____

Space #												
SPACE/ROOM TYPE												
DESIGN USE												
FLOOR AREA (SQ. FT,)												
INTERIOR FINISH												
WALLS												
FLOORS												
CEILING												
LIGHTING												
ARTIFICIAL												
NATURAL CONTROLS												
HEATING SYSTEM												
COOLING												
VENTILATION												
WINDOWS												
CHALKBOARD												
TACKBOARD												
LOCATION CODE												
ROOM CLASS												
PUPIL STATIONS												
TEACHER STATIONS												
CONDITION CODE												
FURNITURE												
STORAGE												